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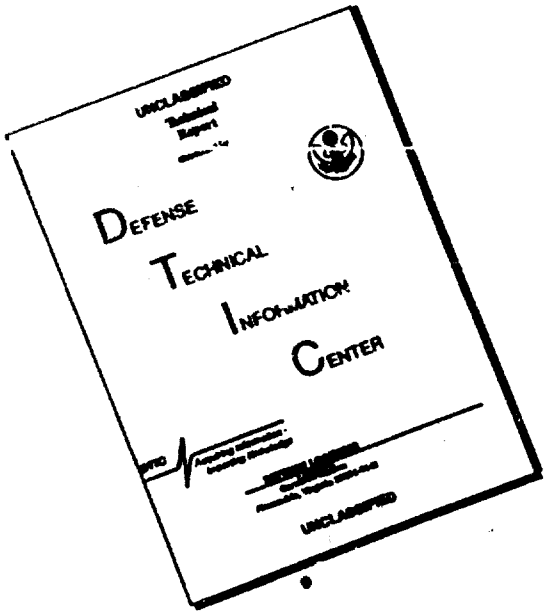

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FINDING OF NO SIGNIFICANT IMPACT

NAME OF ACTION: GROUND WAVE EMERGENCY NETWORK
NORTHWESTERN COLORADO RELAY NODE

DESCRIPTION OF PROPOSED ACTION ALTERNATIVES:

The U.S. Air Force plans to construct a radio communications relay node in northwestern Colorado (Moffat County) as part of the Ground Wave Emergency Network (GWEN) communications system. Five action alternatives associated with five candidate GWEN sites (CGSs) in northwestern Colorado and the no action alternative have been considered and evaluated in an environmental assessment (EA).

GWEN is a radio communications system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear detonations in the ionosphere that would disrupt conventional communications equipment. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system is a network of relay nodes, receive-only stations, and input/output stations. The relay node in northwestern Colorado would be part of the Final Operational Capability (FOC) phase of the GWEN system and would establish essential links with adjacent nodes in the network.

In September 1987, the U.S. Air Force Electronic Systems Division, Hanscom Air Force Base, Massachusetts published a Final Environmental Impact Statement (FEIS) for the GWEN FOC that addressed the system as a whole and identified expected environmental effects common to all sites. Section 5 of the FEIS described a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Network definition identified the need for a relay node in northwestern Colorado. Regional screening resulted in the identification of five CGSs in northwestern Colorado that met the exclusionary and evaluative criteria described in that FEIS. Individual site evaluation examined the relative suitability of the CGSs through site-specific technical studies. The EA is a part of the third phase and is tiered from that FEIS. It addresses the potential environmental effects of the five action alternatives and the no action alternative.

The proposed relay node in northwestern Colorado will be an unmanned facility located on approximately 11 acres of land and, once constructed, will resemble an AM radio broadcast station. The facility will consist of a 299-foot-tall, low-frequency (LF) transmitter tower, three equipment shelters, an access road, and associated fences. The tower will be supported by 24 guy wires, including 12 top-loading elements. An equipment shelter at the tower base will contain an antenna tuning unit. An 8-foot-high chain link fence topped with barbed wire will surround the tower base and associated equipment shelter. A radial ground plane, composed of 60, 0.128-inch-diameter copper wires buried about 12 inches underground, will extend out about 330 feet from the tower base. A 4-foot-high fence will be installed around the perimeter of the copper radials.

A second equipment area located at the site perimeter will contain two shelters housing a back-up power group (BUPG) with two internal fuel storage tanks and radio processing equipment. The BUPG will operate during power outages and for testing purposes. An LF receive antenna, consisting of a pair of 4-foot-diameter rings mounted on a 10-foot pole, and an ultrahigh-frequency (UHF) antenna, used for communicating with airborne input/output terminals and consisting of a 9-foot-high whip-like antenna mounted on a 30-foot-high pole, will also be located in this area. An 8-foot-high chain link fence topped with barbed wire will enclose the entire equipment area. A 10-foot-wide gravel road will connect this area to the tower base. A 12-foot-wide gravel road will provide access to the site from a public road.

The station will use existing commercial three-phase electric power and telephone service. Power and telephone service will be brought to the site through either overhead or buried lines, depending on local utility practices. In its ready status, the antenna will transmit in the LF radio band at 150 to 175 kilohertz for a total of 6 to 8 seconds per hour.

All five action alternatives are discussed in this Finding of No Significant Impact (FONSI).

ANTICIPATED ENVIRONMENTAL EFFECTS

The environmental assessment evaluated potential impacts to the physical, biological, and socio-cultural environment from construction and operation of the relay node.

The project would have no significant impacts on physical resources. Erosion and increased runoff would be minimized by using proper erosion control techniques during construction and by replanting the site afterwards. Impacts to mineral resources would be minor. Paleontological resources are not likely to occur on any of the sites; therefore significant impacts to them are not anticipated. No prime farmland would be removed from production. Water quality would not be significantly affected because increases in copper concentrations due to corrosion of the ground plane would be negligible. Air quality would not be significantly affected. During construction, temporary and insignificant increases in emissions would occur, and during operation, emissions from the BUPG would not be sufficient to result in violation of air quality standards.

The project would have no significant impacts on biological resources. All of the sites are located on either farm or grazing land and do not contain sensitive wildlife habitats. None of the sites contains wetlands or is within a 100-year floodplain. Informal consultation with the U.S. Fish and Wildlife Service indicated that the project would not affect any federally listed threatened or endangered species. The Colorado Department of Wildlife indicated that no state-listed rare, threatened, or endangered species or unique biological communities would be affected by the project. Bird-tower collisions may occur but would not be significant because the tower would be located away from primary bird habitats and migration routes.

The project would have no significant impacts on socio-cultural resources. Construction would have a small, beneficial impact on the local economy, in part by providing temporary employment for contractors and construction workers. Community support systems would not be significantly affected. Land use and noise impacts would not be significant. The relay node signal would not interfere with commercial television or radio broadcasts, amateur radio operations, garage door openers, or pacemakers. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals. The Colorado Historical Society was consulted and has concurred that the project would not affect significant cultural resources. Significant impacts to Native American traditional, religious or sacred sites are not anticipated. A visual analysis conducted in accordance with the criteria developed in the FOC FEIS concluded that the relay node facility would not cause significant visual impacts.

CONCLUSIONS:

No significant impacts to the surrounding environment would be caused by construction and operation of the proposed relay node on the Scott (CGS-2), Stehle (CGS-3C), BLM (CGS-11A), Fagg I (CGS-14A), or Fagg II (CGS-14B) site. Therefore, an environmental impact statement for a GWEN relay node at the cited locations in northwestern Colorado is not required.

David O. Williams, Colonel, USAF
Chairman
HQ ESC Environmental Protection Committee

4 Mar 93
Date

PREFERRED GWEN SITE REPORT
NORTHWESTERN COLORADO

The U.S. Air Force is proposing to construct a relay node for the Ground Wave Emergency Network (GWEN) in northwestern Colorado. The Air Force has followed the siting process described in Section 5 of the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of the GWEN program to identify alternative Candidate GWEN Sites (CGSs). The five CGSs identified in northwestern Colorado are referred to as the Scott, Stehle, BLM, Fagg I, and Fagg II sites.

This report summarizes the process of selecting the preferred site from the five CGSs. This PGSR, along with a site-specific Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), is being distributed for information and comment in compliance with the Air Force's process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).

Operational, environmental, and developmental suitability; construction and real estate acquisition costs; and public comments and concerns are all factors which have been considered in arriving at the selection of the preferred site.

Without an **operationally suitable** location, connectivity of the relay node in northwestern Colorado to the GWEN network cannot be achieved. Operational studies for the Fagg I site could not be completed since the landowner withdrew the site; therefore, the Fagg I site cannot be assumed to be operationally suitable. Ground conductivity measurements taken at the four other sites are acceptable. During the site-specific studies, no radio frequency interference was detected in the GWEN frequency bands which would interfere with the operation of the GWEN receiver. Also, operations at any of the sites would pose no interference with other known systems. Therefore, the Scott, Stehle, BLM, and Fagg II sites are operationally suitable.

The next major factor considered in the selection of the preferred site was **environmental suitability**. The environmental suitability of each CGS was determined from information provided by an independent field analysis and is documented in the EA. The EA for the five CGSs was completed in February 1993. The environmental analysis found that no significant impacts would result from construction of a GWEN relay node at any of the five CGSs. A FONSI for these five sites was completed on 4 March 1993. Thus, all five CGSs are environmentally suitable, and none is environmentally favored over the others.

The Stehle, BLM, and Fagg II sites are **suitable for development** as a GWEN relay node. The FAA has approved construction of the GWEN relay node at any of these three CGSs, but has disapproved construction at the Scott site. Developmental studies for the Fagg I site could not be completed since the landowner withdrew the site; therefore, the Fagg I site cannot be assumed to be developmentally suitable. **Construction cost** is also a consideration in the selection of the preferred site. Construction costs for the developmentally suitable sites are nearly equivalent and are, therefore, not a major factor in the selection of a preferred GWEN site. Thus, of the three operationally, environmentally, and developmentally suitable sites, no site is favored for lower construction costs.

Real estate negotiations have been completed for the BLM site, for the purchase of the Fagg II site, and for the lease of the Stehle site. The BLM site is managed by the

Bureau of Land Management, and is available at no cost to the Government. The owner of the Fagg I site announced his desire to be withdrawn from consideration during negotiations and, therefore, a negotiated amount for either lease or purchase could not be reached. Negotiations have been suspended for the Scott site. Thus, of the three sites for which negotiations have been completed, the BLM site is favored.

With operational, environmental, and developmental factors evaluated and acquisition and construction costs considered, the Air Force prefers the BLM site. The BLM site is preferred because it is operationally, environmentally, and developmentally suitable, has acceptable construction costs, and has the lowest real estate acquisition costs.

I have therefore selected the BLM site as the Air Force's preferred site for development as the GWEN relay node in northwestern Colorado. After reviewing the information received during the IICEP process, I will direct the final land acquisition activities and construction of the GWEN relay node.

STEPHEN T. MARTIN, LT COL, USAF
Program Manager, GWEN

12 March 93
(Date)

GROUND WAVE EMERGENCY NETWORK
FINAL OPERATIONAL CAPABILITY

ENVIRONMENTAL ASSESSMENT
FOR
NORTHWESTERN COLORADO RELAY NODE

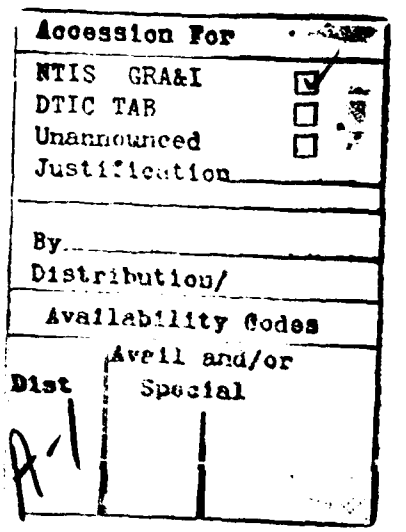
SITE NO. RN 8C924CO

19 February 1993

Electronic Systems Center
Air Force Material Command, USAF
Hanscom AFB, Massachusetts 01731-1623

GROUND WAVE EMERGENCY NETWORK
FINAL OPERATIONAL CAPABILITY

ENVIRONMENTAL ASSESSMENT
FOR
NORTHWESTERN COLORADO RELAY NODE
SITE NO. RN 8C924CO



19 February 1993

Electronic Systems Center
Air Force Material Command, USAF
Hanscom AFB, Massachusetts 01731-1623

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SUMMARY

The Ground Wave Emergency Network (GWEN) is a radio communication system designed to relay emergency messages between strategic military areas in the continental United States. The system is immune to the effects of high-altitude electromagnetic pulse (HEMP) energy surges caused by nuclear bursts in the ionosphere that would disrupt conventional communications equipment such as telephones and shortwave radios. A failure of such equipment would prevent timely communications among top military and civilian leaders and strategic Air Force locations and prevent U.S. assessment and retaliation during an attack. GWEN is an essential part of a defense modernization program to upgrade and improve our nation's communications system, thereby strengthening deterrence.

The GWEN system consists of a network of relay nodes, receive-only stations, and input/output stations. Each relay node, such as the one proposed in northwestern Colorado, consists of a guyed radio tower facility similar to those used by commercial AM broadcast transmitters.

A Final Environmental Impact Statement (FEIS) for the GWEN Final Operational Capability (FOC) was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. That FEIS addressed the GWEN system as a whole, identifying expected environmental effects common to all sites. Section 5, beginning on page 5-1 of the FEIS describes a siting process that is designed to minimize the potential for environmental impacts. This process has three distinct phases: network definition, regional screening, and individual site evaluation.

Phase 1, network definition, identified the geographic coordinates that met the operational needs and technical constraints of the network. Each set of coordinates became the center of a circular site search area (SSA) with a 9-mile radius (250 square miles). The SSA discussed in this Environmental Assessment (EA) was located in Moffat and Routt counties in northwestern Colorado. The SSA was centered approximately 1 mile southeast of the town of Craig, in Moffat County, at latitude 40.50° N and longitude 107.53° W. The only town in the SSA is Craig.

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to avoid environmentally sensitive areas. The remaining areas, called potential areawide sites (PAWS), became the focus of the siting process. A field investigation for northwestern Colorado was conducted in August 1989. Nineteen sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs). All PCGSs were located in Moffat County. One PCGS was located outside of the SSA due to the limited number of suitable candidate sites within SSA boundaries; this site was evaluated under the same FEIS siting criteria as the sites within the SSA. Attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate eleven PCGSs. One PCGS was Bureau of Land Management (BLM) land and did not require a right-of-entry. Following evaluation against the environmental siting criteria set forth in the FEIS, five of the twelve PCGSs were recommended as candidate GWEN sites (CGSs) for further review. These CGSs were described in the Preliminary Site Evaluation Report (PSER) of October 23, 1989.

Subsequent to the PSER being issued, and site-specific studies being accomplished, a CGS landowner withdrew one site from consideration (Fagg I, CGS-14A). This landowner is no longer interested in leasing or selling land to the Air Force. However, since all site-specific studies had been accomplished on this site prior to the owner's withdrawal and because this site continues to be considered a viable alternative, the Air Force has presented this data on the withdrawn site in this EA.

Phase 3, individual site evaluation, involves evaluating the relative suitability of the candidate sites through site-specific technical studies. This EA is a product of those evaluations and discusses the five siting alternatives in northwestern Colorado. It addresses only those criteria that apply to the candidate sites. The sixth alternative, no action, would impair performance of the GWEN system but leave the environment unchanged.

To be suitable for construction and operation, a site should measure at least 700 by 700 feet (approximately 11 acres), be relatively level and undeveloped, be free of natural or

man-made obstructions, and have soils capable of supporting relay node structures. The site should also be close to all-weather roads, commercial three-phase power, and telephone lines to minimize costs. To operate effectively, the site must be located at least a minimum distance from obstructions that could affect reception and transmission. These include buildings and towers, high-voltage power lines, and other communications systems or sources of radio-frequency interference. Specific minimum distances depend on height and power levels of identified obstructions or interfering sources.

This EA shows that construction and operation of a GWEN relay node on any of the five candidate GWEN sites would have no significant impacts. During the 6-week construction period, the project would cause temporary and insignificant air quality and noise impacts and slight increases in traffic. It would have a small, beneficial impact on the local economy, in part because it would provide temporary employment for contractors and construction workers. If built on any of the above five sites, the project would have no significant impacts on air quality; water quality; land use; known paleontological resources; biological resources, including threatened and endangered species; mineral or energy resources; or cultural resources that are listed, eligible, or potentially eligible for listing on the National Register of Historic Places. Visual impacts would not be significant. Radio-frequency emissions outside the fenced area around the tower base would not pose a health hazard to humans or animals.

1.0 PURPOSE AND NEED FOR ACTION

The proposed action covered by this Environmental Assessment (EA) includes construction and operation of a relay node of the Ground Wave Emergency Network (GWEN) in northwestern Colorado (see Figure 1.1 of this EA). This relay node will provide essential connections with adjacent nodes in the network. The major features of a GWEN relay node and associated environmental impacts common to all sites are addressed in the Final Environmental Impact Statement (FEIS) for the Final Operational Capability (FOC) phase of GWEN, which was published in September 1987 by the Electronic Systems Division, Hanscom Air Force Base, Massachusetts. This EA is tiered from that FEIS and addresses site-specific conditions at the candidate GWEN sites (CGSs) for this particular site search area (SSA).

The purpose of GWEN is to provide to the President and the National Command Authority a strategic communications network that is immune to the effects of high-altitude electromagnetic pulse (HEMP) and will carry critical attack warning and force execution data. As a result, GWEN will remove any possibility of potential aggressors taking advantage of the electromagnetic pulse generated by a high-altitude nuclear burst. A HEMP surge would disrupt the nation's electric power line transmission capability, cripple electronic devices, and adversely affect skywave communications networks based on conventional electronics. GWEN provides a low-frequency (LF) ground wave communication network that will not be affected by HEMP effects. It thereby strengthens deterrence by removing the option of beginning an attack against the United States by using HEMP effects.

A partial GWEN network, called the Thin Line Connectivity Capability (TLCC), has been completed. It contains 8 input/output stations, 30 receive-only stations, and 54 relay nodes. The TLCC provides a limited level of HEMP-protected communications to strategic forces and the National Command Authority.

The FOC phase of GWEN will add 29 relay nodes. The FOC will allow communication along several routes, thereby enhancing system availability and ensuring that vital communications will be maintained.

FIGURE 1.1 NORTHWESTERN COLORADO SITE SEARCH AREA (SSA), MOFFAT AND ROUTT COUNTIES

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The five action alternatives are site-specific applications of the standard relay node design presented in the FEIS. Consequently, they share a number of features that are discussed in Section 2.1 of this EA. The site-specific features are discussed in Sections 2.2 through 2.6 of this EA. Site descriptive data was obtained during field investigations conducted in August 1989. Figure 2.1 of this EA shows the five CGSs in relation to the major features of the SSA. Figure 2.2 and Appendix B of this EA show the locations of the CGSs in relation to roads and surrounding topography, respectively.

2.1 Common Features of the Action Alternatives

2.1.1 Site Selection Process

The process used to select sites is described in Section 5, beginning on page 5-1 of the FEIS. This process has three distinct phases: network definition, regional screening, and individual site evaluation. Appendix A of this EA provides a diagram of the site selection process. The environmental criteria used in this process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.

Phase 1, network definition, involved locating network nodes to optimize their performance while serving a predetermined number of users. A typical GWEN ground wave has an effective range of about 150 to 200 miles. Thus, relay nodes could not be located independently; changing the location of one would affect the connectivity with other nodes in the network. Once the optimal coordinates of the relay nodes were identified, a 9-mile-radius SSA was defined around each point to provide suitable opportunity for siting a relay node near that point. The 9-mile radius was chosen because it provided a reasonably sized search area consistent with the technical constraints of the relay node. If a significant portion of an SSA fell within an environmentally highly sensitive area such as a national park or wilderness area, an alternative was selected and its connectivity evaluated. This process was repeated until all relay nodes fell outside such areas.

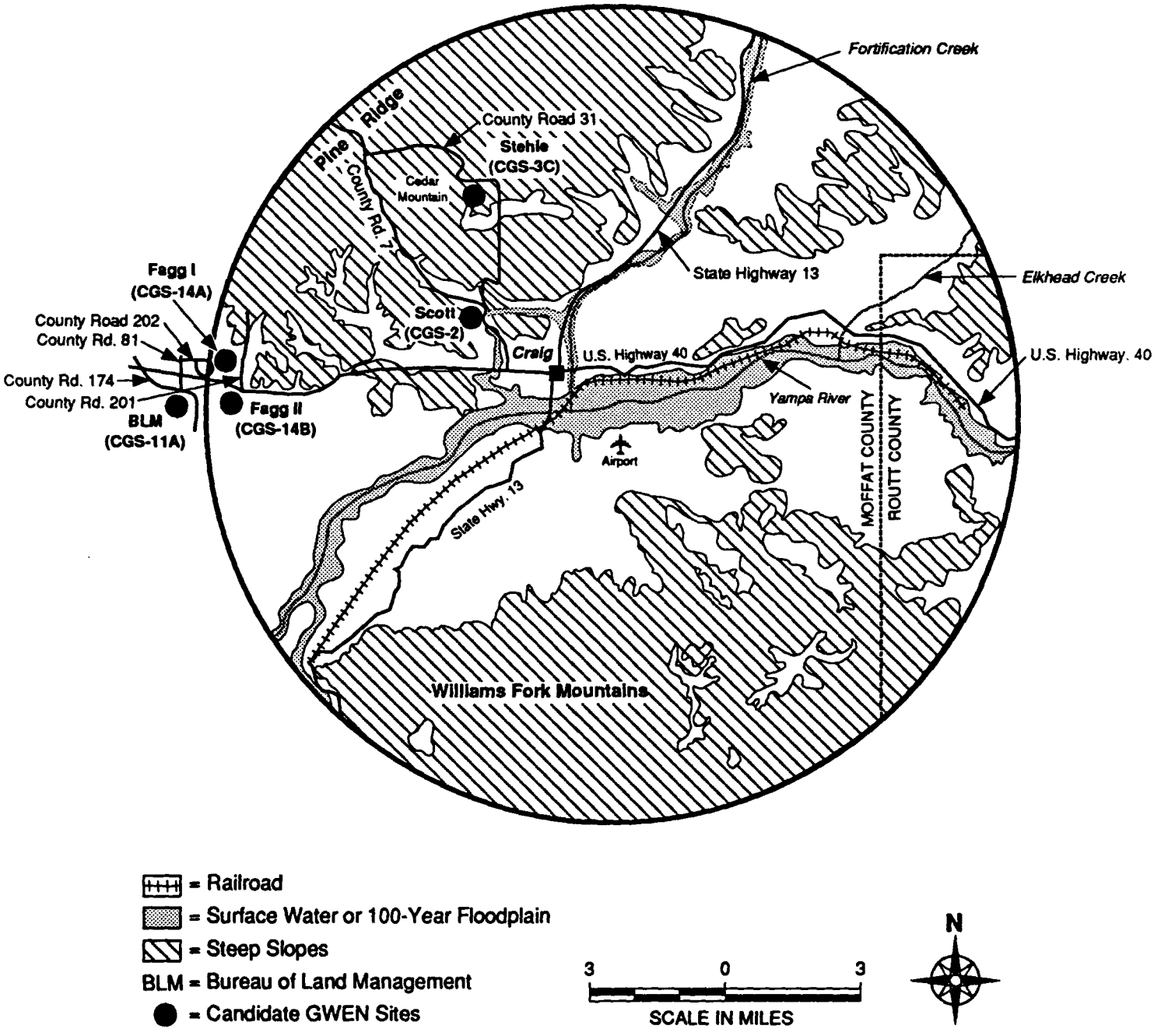

FIGURE 2.1 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) RELATIVE TO SELECTED MAJOR FEATURES AND ROADS WITHIN AND NEAR THE NORTHWESTERN COLORADO SITE SEARCH AREA

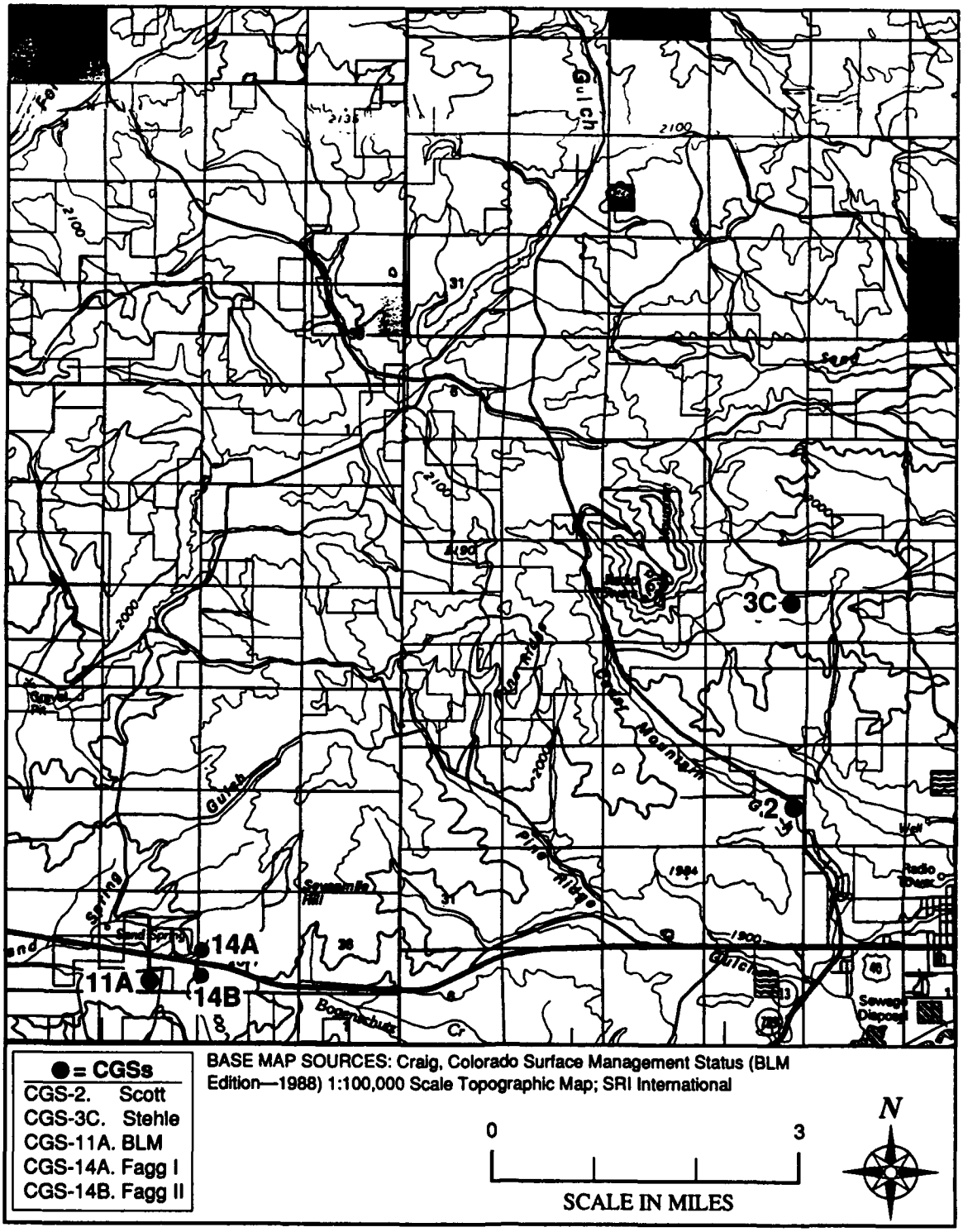

FIGURE 2.2 LOCATIONS OF CANDIDATE GWEN SITES (CGSs) IN MOFFAT COUNTY, NORTHWESTERN COLORADO

Phase 2, regional screening, involved the application of exclusionary and evaluative criteria to the SSA to identify areas that might contain operationally acceptable sites outside environmentally sensitive areas. The resulting search areas, called potential areawide sites (PAWS), were submitted to appropriate federal, state, and local officials for review. The PAWS were then redefined, as appropriate, by incorporation of the comments of the reviewers, and a field investigation was conducted to find suitable candidate sites for a GWEN relay node within the redefined PAWS.

The field investigation for northwestern Colorado was conducted in August 1989. Nineteen sites were identified during automobile-based surveys as potential candidate GWEN sites (PCGSs). All PCGSs were located in Moffat County. One PCGS was located outside of the SSA due to the limited number of suitable candidate sites within SSA boundaries; this site was evaluated under the same FEIS siting criteria as the sites within the SSA. Attempts were made to contact the owners of the sites to determine their interest in selling or leasing land to the Government. Rights-of-entry were granted to investigate eleven PCGSs. One PCGS was Bureau of Land Management (BLM) land and did not require a right-of-entry. Following evaluation against the environmental siting criteria set forth in the FEIS, five of the twelve PCGSs were recommended as CGSs for further review.

Subsequent to the PSER being issued, and site-specific studies being accomplished, a CGS landowner withdrew one site from consideration (Fagg I, CGS-14A). This landowner is no longer interested in leasing or selling land to the Air Force. However, since all site-specific studies had been accomplished on this site prior to the owner's withdrawal and because the site continues to be considered as a viable alternative, the Air Force has presented this data on the withdrawn site in this EA.

Phase 3, individual site evaluation, of which this EA is a part, is then used to determine the relative suitability of the candidate sites through site-specific technical studies. This EA presents the results of the environmental portions of those studies and covers site-specific impacts associated with construction of a relay node in northwestern Colorado. These are summarized in Sections 4.2 through 4.6 of this EA. The findings of this EA and site-specific studies of operational parameters will be used to select a preferred GWEN site (PGS).

2.1.2 Relay Node Construction and Operation

A typical relay node site is located on approximately 11 acres of land (see Figure 2.3 of this EA). It is an unmanned facility consisting of a 299-foot-tall, three-sided, 2-foot-wide LF transmitter tower, three equipment shelters, an access road, and associated fences. The tower has a base insulator and lightning protection and is supported by 24 guy wires, including 12 top-loading elements to further strengthen the signal and provide additional structural support.

These guy wires and top-loading elements are attached to the tower and to 18 buried concrete anchors. The sizes of these anchors and their depth of burial varies with local soil and bedrock properties. However, the guy-wire anchors typically are rectangular blocks buried 5 feet below the surface. If bedrock occurs at or near the surface, the anchors are special rock-embedded rods. The tower base is concrete with a cross-section area resembling an inverted T. The size of this foundation is determined by soil conditions.

A radial ground plane, composed of 60 buried copper wires, extends out from the base of the tower. Each wire is 0.128 inch in diameter, about 330 feet long, and buried approximately 12 inches underground. The ground plane helps to strengthen the broadcast signal, and the number and length of the wires depend on the soil conductivity at the site. A 4-foot-high fence is installed around the perimeter of the ground plane to protect the ground plane and guy anchors and to prevent inadvertent exposure to electric shock resulting from the buildup of static electric charge.

In addition to the main tower, the relay node has two other antennas. One is an LF receive antenna made up of a pair of 4-foot-diameter rings mounted on a 10-foot pole. The second is an ultrahigh-frequency (UHF) antenna used for communicating with airborne input/output terminals. It is a 9-foot-high whip-like antenna mounted on a 30-foot-high pole. Both antennas are located within the equipment area at the perimeter of the site, which is enclosed by an 8-foot-high fence.

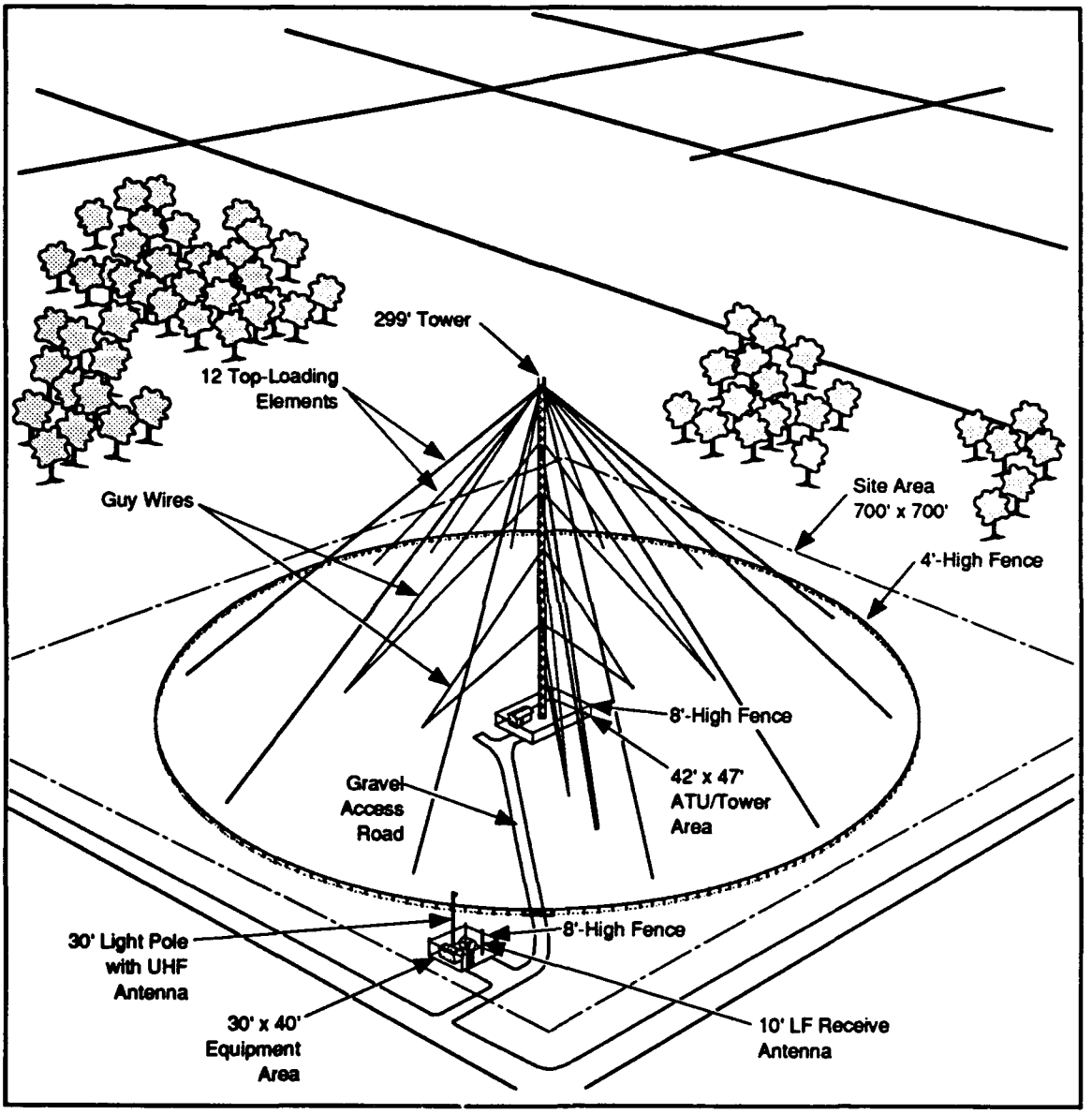

FIGURE 2.3 TYPICAL LAYOUT OF FOC RELAY NODE STATION

The siting and design of the tower are coordinated with the Federal Aviation Administration (FAA) to ensure compliance with FAA standards and regulations. The tower is equipped with a white strobe light at the top, which emits 40 flashes per minute and is rated at 20,000 candelas for daytime and twilight use and 2,000 candelas for nighttime use. To minimize glare at ground level, the light is focused upward and horizontally outward.

GWEN operates intermittently in the LF radio band at 150 to 175 kilohertz (kHz). For comparison, the low end of the AM band for commercial broadcasts is 530 kHz. The peak broadcast power for each GWEN tower is from 2,000 to 3,000 watts, depending on local soil conditions. In its ready status, GWEN typically transmits between 6 and 8 seconds per hour. GWEN does not interfere with commercial television, radio broadcasts, amateur radio operations, garage door openers, or pacemakers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

All equipment shelters are anchored to concrete pads. One shelter, located at the base of the tower, houses the antenna tuning unit (ATU). Two other shelters are located side by side in the equipment area enclosed at the perimeter of the property. One houses radio processing equipment, and the other houses a 70-horsepower, back-up diesel generator and two aboveground fuel tanks. The generator operates 2 hours per week for testing purposes and during power outages. Locked, 8-foot-high chain link fences topped with barbed wire secure the equipment shelter areas at the base of the tower and at the perimeter of the site to provide safety and to inhibit unauthorized entry. A 12-foot-wide gravel road provides access to the equipment area enclosure at the perimeter of the property. A 10-foot-wide gravel road leads from the equipment enclosure to the tower.

Fuel is stored in two aboveground steel tanks inside the generator shelter. Tank capacities are 559 gallons and 461 gallons. Each tank pipes fuel separately to the back-up power group (BUPG) and is equipped with two outlet shut-off valves, one controlled manually and one controlled automatically. If a leak occurs, fuel will flow into a floor drain leading to a tightly capped pipe extending outside the BUPG. Once approximately 2 gallons of fuel accumulate in the pipe, a "liquid spill" signal is sent to the GWEN Maintenance Notification Center, which will dispatch maintenance personnel. However, if a leak were not detected, an explosion inside the shelter would be extremely unlikely due

to the high flash point of diesel fuel. If a tank at the GWEN station failed, the entire contents of one tank could be released and contained inside the BUPG shelter. Refer to Section 4.12.1.1, beginning on page 4.12-1 of the FEIS for further discussion on diesel fuel spills and leaks.

The station uses existing commercial three-phase electric power and telephone service, but does not require water, septic, or sewer systems. Power and telephone service are brought to the site through either overhead or buried lines, depending on local utility practices. Power and telephone service are generally brought underground from the site boundary to the equipment shelter area.

Temporary increases in air pollutant emissions will occur during construction, primarily from greater use of heavy machinery than is required in normal farming operations. Emissions resulting from operations of the facility will be limited to the operation of the BUPG, which will operate only 2 hours every week for testing purposes and for additional periods as required during power outages. Thus, the generator will operate for a total of 152 hours per year, if commercial power outages totaled 48 hours. If the generator runs at 100 percent load during the projected 152-hour operating time, total emissions in one year will be less than 350 pounds per pollutant, as documented in Section 4.3.1, beginning on page 4.3-1 of the FEIS.

Noise levels generated by construction equipment are discussed in Section 4.5.1.1, beginning on page 4.5-1 of the FEIS. Under worst-case assumptions, levels could reach 78 dBA at the site boundary from on-site activity and 92 dBA at distances of 50 feet from equipment installing the off-site access road. Noise generated during GWEN operation would come from the BUPG, which will operate only 2 hours per week and during commercial power outages. The BUPG will be located at least 50 feet within the site boundary with its exhaust side oriented toward the tower area. Noise levels due to intermittent operation of the BUPG will be less than 72 dBA at the site boundary, which is within the standards typically set for lands under agricultural use (70 to 75 dBA). At 50 feet beyond the site boundary, the noise level would drop below 65 dBA, which is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA).

These noise levels and standards are discussed in Section 3.5.3, page 3.5-2 and Section 4.5.1, pages 4.5-1 through 4.5-6 of the FEIS.

Construction will require as many as 20 workers at any given time and take about 6 weeks. Standard earth-moving and erection equipment will be used, as detailed in Table 2-1, page 2-14 of the FEIS. Erosion control techniques that are consistent with local practices will be used during construction. Vegetation removal and grading at any of the sites would be minimal. The site will be replanted after construction is finished.

After construction is completed, personnel requirements will be limited to periodic maintenance by a contractor who will service the equipment, cut the surface growth, remove snow from the access road, and perform other services as needed. Security services will be arranged with local authorities. The projected life of the facility is 15 to 25 years. Upon decommissioning, the tower and other structures will be removed, as discussed in Section 2.1.4, page 2-18 of the FEIS.

2.2 Alternative 1: Scott Site (CGS-2)

The Scott site is 14 feet south of County Road 7 in the northeast quarter of the southeast quarter (NE1/4 SE1/4) of Section 27, Township 7N, Range 91W, Moffat County. The site is approximately 1.7 miles north of U.S. Highway 40 in the southwestern corner of the intersection of County Road 7 and County Road 31, both of which are paved, all-weather roads. Access would be from County Road 7; a 14-foot access road and a culvert would be required.

Three-phase power would be obtained from overhead lines on the south side of County Road 7, adjacent to the northwestern corner of the site. Telephone lines would be connected to an underground cable approximately 40 feet north of the site, along the north side of County Road 7.

Appendix B, Figure B.1 of this EA, provides a map showing the surrounding topography.

2.3 Alternative 2: Stehle Site (CGS-3C)

The Stehle site is 26 feet south of County Road 31 in the NE1/4 SE1/4 of Section 15, Township 7N, Range 91W, Moffat County. The site is approximately 3.25 miles north of U.S. Highway 40 and 1.75 miles east of County Road 7. County Road 31 is an all-weather, gravel road. Access would be from County Road 31; a 26-foot access road and a culvert would be required.

Three-phase power would be obtained from overhead lines adjacent to the northern site boundary. Telephone lines would be connected to an underground cable located along County Road 31 approximately 600 feet east of the site.

Appendix B, Figure B.2 of this EA, provides a map showing the surrounding topography.

2.4 Alternative 3: BLM 2 Site (CGS-11A)

The BLM site is approximately 0.5 mile west of the SSA boundary, 29 feet south of County Road 174 in the S1/2 of Section 34, Township 7N, Range 92W, Moffat County. The northern site boundary is adjacent to the intersection of County Road 81 and County Road 174, and approximately 0.1 mile south of the intersection of County Road 81 and U.S. Highway 40. Access would be from County Road 174; a 29-foot access road and a culvert would be required.

Three-phase power would be obtained from overhead lines approximately 700 feet north of the site, on the north side of U.S. Highway 40. Telephone lines would be connected to an underground cable 20 feet from the northern site boundary, along the south side of County Road 174.

Appendix B, Figure B.3 of the EA, provides a map showing the surrounding topography.

2.5 Alternative 4: Fagg I Site (CGS-14A)

The Fagg I site is 100 feet north of U.S. Highway 40 in the NW1/4 SW1/4 of Section 35, Township 7N, Range 92W, Moffat County. The site is 0.5 mile west of the intersection of U.S. Highway 40 and County Road 201. Access would be from U.S. Highway 40; a 100-foot access road and a culvert would be required.

Three-phase power would be obtained from overhead lines adjacent to the southern site boundary. Telephone lines would be connected to undreground cable, also adjacent to the southern site boundary.

Appendix B, Figure B.4 of this EA, provides a map showing the surrounding topography.

2.6 Alternative 5: Fagg II Site (CGS-14B)

The Fagg II site is 30 feet south of U.S. Highway 40 in the SW1/4 SW1/4 of Section 35, Township 7N, Range 92W, Moffat County. The site is 0.5 mile southwest of the intersection of U.S. Highway 40 and County Road 201. Access would be from U.S. Highway 40; a 30-foot access road and a culvert would be required.

Three-phase power would be obtained from overhead lines 153 feet north of the site, north of U.S. Highway 40. Telephone lines would be connected to underground cable, approximately 160 feet north of the site, also across U.S. Highway 40.

Appendix B, Figure B.5 of this EA, provides a map showing the surrounding topography.

2.7 No Action Alternative

The no action alternative is deletion of the northwestern Colorado relay node from the GWEN network. Adoption of this alternative would mean a consequent degradation in the performance of the system, due to a lack of connectivity to other nodes in the system.

3.0 AFFECTED ENVIRONMENT

This section discusses the environmental setting of the proposed GWEN project in northwestern Colorado. Section 3.1 of this EA describes the general characteristics of the SSA, and Sections 3.2 through 3.6 of this EA describe the unique characteristics of each CGS within the SSA. Site descriptive data was obtained during field investigations conducted in August 1989. U.S. Geological Survey 7.5 minute topographical maps were used as data sources for distances, physiographic features, and topography (USGS, 1966a-c, 1969a-b, 1971a-c, 1972, and 1973a-c).

3.1 Site Search Area

Presented below is information on the physical, biological, and socio-cultural settings of the SSA.

3.1.1 Physical Setting

The SSA in northwestern Colorado is a circular, 250-square-mile area in Moffat and Routt counties, centered approximately 1 mile southeast of the town of Craig, in the Rocky Mountains physiographic province of the United States. The SSA is in the southern portion of a broad lowland known as the Wyoming Basin, one of three great physiographic subdivisions in northwestern Colorado. This lowland is made up of a series of sub-basins, one of which is the Yampa Basin, in which the SSA is located. The Yampa Basin is characterized by broad areas of low relief interrupted by scarps and dissected cuestas (CASA, 1990).

The topography within the SSA consists of rolling hills and steep slopes; elevations range from 6,400 to 7,800 feet above mean sea level (MSL). The most significant features of the SSA are the Yampa River, which meanders east to west through the middle of the SSA, the Williams Fork Mountains to the south, and Pine Ridge and Cedar Mountain to the northwest. The Yampa River Valley is fairly broad within the SSA, but west of the SSA it narrows to deep canyons (Stokes, 1955). The CGSs are located in what is considered a

cold desert; natural vegetation is primarily grass and sagebrush, with some rabbitbrush and prickly-pear cactus common in overgrazed areas (CASA, 1990).

The CGSs are on either the Browns Park or Fort Union formations, or on narrow bands of alluvium. The Browns Park formation is made up of sandstone, conglomerate, tufaceous sandstone, and siltstone from the Miocene epoch, 5 to 25 million years ago. The BLM (CGS-11A), Fagg I (CGS-14A), and Fagg II (CGS-14B) sites are all located on the Browns Park formation. The Fort Union formation consists of shale, sandstone, and coal from the Paleocene epoch, 55 to 65 million years ago. The Stehle (CGS-3C) site is located on the Fort Union formation. A narrow alluvium stream valley of the Quaternary period, 2 to 3 million years ago, is associated with the Scott site (CGS-2) (Colorado Geological Survey, 1977).

The level of seismic hazard in the SSA is low. The SSA is on the boundary between the Sand Wash basin to the north and the White River uplift to the south. Although several high-angle faults lie northwest and west of Craig, none lies on the CGSs. Normal faults in the vicinity have been active within the last 15 million years, but none is known to be currently active. Abundant balanced rock formations in the region and the lack of recorded earth tremors indicate that the area has been stable for some time (Crowley, 1955). Six earthquakes have had epicenters within a 35-mile radius of the SSA center. In 1978, an event of undetermined intensity was centered 4 miles west, and three earthquakes of Modified Mercalli (MM) intensity V had epicenters 23 miles east, 34 miles east, and 26 miles northeast of the SSA. The strongest quake recorded in the area was an 1891 event of MM intensity VI, 25 miles west of the SSA center (Howard *et al.*, 1978; Kinney, 1966; Stover *et al.*, 1984; Stover, 1986). Based on historic records, the strongest earthquakes expected in the vicinity would have a MM intensity VI, which can cause slight damage to poorly constructed buildings, but would not be expected to cause significant damage to well-built structures (Manitakos, 1989).

Paleontological resources have been plentiful in Colorado, particularly where plunging rivers and protruding mountain uplifts have been exposed. The vicinity of the Dinosaur National Monument, 60 miles west of the SSA, has produced some well-known paleontological resources. Other scientifically significant finds have been revealed near

Sand Wash Basin to the north (McKenna, 1955) and, more recently, at Fort Collins in northeastern Colorado (San Jose Mercury News, 1990). However, no evidence of subsurface geological features, such as sinkholes and bluff exposures, exists at the CGSs, so it is not likely that paleontological resources will be found during construction (Stuckey, 1989).

Northwestern Colorado is rich in mineral resources. Historically, coal, natural gas, oil, and gold played an important role in the economic development of the region (Vieaux, 1955). However, coal, oil, and natural gas are the only natural resources of commercial value in the Craig area today (Hook, 1991). There are six operating coal mines south of the Yampa River. The closest coal mine to a CGS is the Trapper Mine located 5 miles south of Craig. This mine supplies up to 2.5 million tons of coal per year, which is primarily used for the Colorado-Ute Craig Station, a coal-fired power plant and the largest producer of electricity in Colorado (Davidson, 1991). Although these reserves south of the river are superior to those in the north, abundant coal reserves of secondary quality are throughout the area north of the Yampa River and are likely to be found at all the CGSs. However, mining of these reserves is unlikely because of their lower quality and their proximity to populated areas. Coal rights to the reserves on four of the CGSs are held by the BLM; coal rights at CGS-3 are held privately (Hook, 1991).

Natural gas reserves could be found under CGS-11A, CGS-14A, and CGS-14B because the area just south of these sites has been developed for natural gas. Generally these rights are privately held and have enabled some local residents to create a regular income from natural gas extraction. The oil reserves in Craig Dome, located 3 miles south of Craig, had been the region's largest but were depleted by the 1940s (Vieaux, 1955). Gold has not been mined since the early 1900s (Davidson, 1991).

Soils throughout the SSA are generally 60 or more inches deep before bedrock is reached. The soils on the CGSs are Battlement fine sandy loam, Yamo loam, Battlement saline, Evanston-Forell loam, Berlake sandy loam, Rock River, Weed, and Ironspring sandy loam. These well-drained soils have a seasonally high water table greater than 6 feet from the surface (SCS, 1988). Although these soils are erosive and debris can be rapidly removed by surface water runoff, mature soils are formed along parts of the major

stream corridors (Stokes, 1955). In addition, soils within the region are moderately susceptible to wind erosion. Hazards from soil blowing are mostly associated with nonirrigated crop production, livestock grazing, and noncritical habitat for wildlife (Simons, 1990). These soils are usually neutral but may vary from mildly to moderately alkaline, with pH values ranging from 6.6 to 8.4 (Schroeder, 1990). There are no designated prime farmlands in Moffat County (Hasken, 1989). None of the soils is hydric (SCS, 1987). The specific soils on each CGS are discussed in Sections 3.2 to 3.6 of this EA.

Groundwater is found at varying depths throughout the SSA. Aquifers are located within sand and gravel in the alluvium of the Yampa River and its principal tributaries; sand, semiconsolidated sandstones, and conglomerates of the Browns Park formation; and sandstones of the Fort Union, Wasatch, Williams Fork, and Iles formations; and fractured and weathered shales in the Lance formation and the Lewis and Mancos shales. The alluvium unit yields as much as 900 gallons per minute (gal/min). Water quality from this resource varies according to underlying rock. The Fort Union and Browns Park formations each yield as much as 25 gal/min (USGS, 1977).

The SSA is in the Yampa River drainage basin, where drainage flows westward. Runoff from the foothills north and south of the Yampa River Basin reaches the Yampa River via small intermittent streams. Two of these intermittent streams handling rainwater runoff cross the corner of two CGSs (CGS-2 and CGS-14A). The main perennial stream in the area is Fortification Creek, which runs through the town of Craig. Above the Yampa River, these streams have an extremely narrow floodplain corridor. Flood hazard for the region is low. None of the CGSs is located within a 100-year floodplain (FIA, 1982 and 1984). No underground springs or seeps are present at any of the sites (USGS, 1977). Distances from each CGS to the nearest surface water or wetland are given in Sections 3.2 through 3.6 of this EA.

The climate of Moffat and Routt counties is characterized by cold winters and mild summers. Average monthly temperatures range from about 15°F in January to about 70°F in July. Average annual precipitation at the Hayden weather station, Routt County, is 15.5 inches. Heavy rains and severe storms occur during late winter and spring, while August is generally the driest month. The growing season is from late April or early May to

September and lasts approximately 140 days. Snowfall can be heavy at times, and blizzards are not uncommon; however, snowfall is generally not destructive or disruptive (NOAA, 1975).

Air quality in Moffat County is in attainment of Colorado Primary and Secondary Ambient Air Quality Standards (Administrative Rules of Colorado, 16.8.1102). No areas defined as Class I by the Clean Air Act or Wilderness Study Areas occur within 30 miles of the SSA (Miller, 1989). Air quality standards are discussed in Section 3.3.3, pages 3.3-1 to 3.3-7 of the FEIS.

3.1.2 Biological Setting

The SSA is typical of a desert grassland with its shrubs, grasses, and cacti. Vegetation consists of mountain mahogany and scrub oak woodlands on the steeper slopes of the southern portion of the SSA and sagebrush steppe on the flatter lands of the central and northern portions. Common plant communities occurring in generally undisturbed grasslands are *fescue*, *wheatgrass*, *needlegrass*, and big sagebrush. A variety of forbs and wildflowers is also widely distributed throughout the region. Vegetation on the CGSs consists of nonirrigated hay crops or mixtures of fescue grass, sagebrush, and small cacti. Indigenous trees are uncommon within the SSA, except along rivers, such as the Yampa River floodplain, which is lined with cottonwood trees (Garrison *et al.*, 1977).

Common animals in the region, both game and nongame species, include pronghorn antelope, bighorn sheep, as well as smaller mammals, such as coyotes, jackrabbits, cottontail rabbits, and various small rodents. Mule deer migrate and winter in the area. Conspicuous bird species associated with the region are sandhill cranes, sage and sharp-tailed grouse, herons, hawks, and eagles (Garrison *et al.*, 1977). An active golden eagle nest is located about halfway up the east slope of Cedar Mountain in the northwestern section of the SSA (Bauman, 1991). It is at least 1 mile from the closest CGS (CGS-2). The roosting period for golden eagles is between December and May (Jones, 1990). Raptors common in summer are northern harriers, red-tailed hawks, sharp-shinned hawks, and prairie falcons (Garrison *et al.*, 1977). The most common passerines are the horned lark, American robin, sage thrasher, western kingbird, black billed magpie, yellow-headed

blackbird, red-winged blackbird, barn swallow, cliff swallow, and violet-green swallow (Jones, 1990).

The *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336) states that an area must meet three criteria to be designated as wetland: hydric soils; hydrophytic vegetation; and wetlands hydrology, which includes a shallow water table and standing water for at least 7 days of the growing season (FICWD, 1989). This manual was used as the basis for wetland determination. Based on field investigations (Kroupa, 1990) and soils data (SCS, 1987 and 1988), none of the CGSs examined as part of this EA meets these three criteria, nor do the areas within 300 feet of the CGSs. Wetlands in the SSA are found along the narrow floodplain corridor of the Yampa River and are extremely scarce beyond its banks (Toolen, 1989b). The closest point these wetlands come to any CGS is 2.3 miles (CGS-2) (USGS, 1969a).

In compliance with Section 7 of the Endangered Species Act of 1973, as amended (16 United States Code [USC] 1531, *et seq.,* at 1536), lists of threatened and endangered species that could occur in the area of the SSA were obtained during informal consultations with the U.S. Fish and Wildlife Service (USFWS) (Appendix C, Noonan, 1989, pages C-4 and C-5 of this EA; Appendix C, Carlson, 1992, pages C-10 to C-13 of this EA). According to the latest list, only two species federally listed as endangered or threatened were identified as possibly occurring in the SSA: the bald eagle (*Haliaeetus leucocephalus*) and the black-footed ferret (*Mustela nigripes*). In addition, the USFWS indicated that the SSA lies within the overall migratory corridor of the federally endangered whooping crane (*Grus americana*), and that the federally endangered peregrine falcon (*Falco peregrinus anatum*) nests in northwestern Colorado during the summer (Carlson, 1989).

Nine federal candidate species also potentially occur in the SSA:

Common Name	Latin Name
Black tern	*Chlidonias niger*
Ferruginous hawk	*Buteo regalis*
Columbian sharptailed grouse	*Tympanuchus lucida*
Fringed-tailed myotis	*Myotis thysanodes pahasapensis*
Spotted bat	*Euderma maculatum*
Great Basin silverspot butterfly	*Speyeria nokomis nokomis*
Hamilton milk-vetch	*Astragalus hamiltonii*
Gibbens beardtongue	*Penstemon gibbensii*
Ownbey's thistle	*Cirsium owenbeyi*

The bald eagle is primarily associated with riparian areas such as coasts, rivers, and lakes and usually nests and feeds near large bodies of water. Although the bald eagle is an opportunistic feeder and will take a variety of vertebrate prey, fish comprise the major part of its diet. The bald eagle winters along the Yampa River and its connecting gulches.

The black-footed ferret is a large, weasel-like mammal that feeds on white- and black-tailed prairie dogs (*Cynomoys* species) and so is generally found near prairie dog towns. Black-footed ferrets once occurred in the region, but their presence in Colorado today is extremely rare (Carlson, 1989). Only two dozen of these mammals are known to exist in the wild and these are protected in a Wyoming wilderness preserve (Murray, 1987). There are no known prairie dog towns near the SSA (Bauman, 1991).

During migration, the whooping crane flies during daylight hours and roosts during the night in wetlands and cultivated areas, such as grainfields. It generally flies approximately 2,000 feet above the terrain during migration and can be found flying at lower levels during poor flying conditions, when entering or leaving nightly roosts, or when flying from roosts to feeding areas. Approximately thirteen whooping cranes of the Grays Lake flock use this corridor during their annual Idaho-to-New Mexico migration. The flock travels over several

mountain ranges and through the San Juan Valley in southwestern Colorado, where it spends a great deal of time before continuing on to its principal summer or winter ranges (Lingle, 1990). Whooping crane flights are concentrated west of the CGSs (Toolen, 1989a).

The peregrine falcon, a predator of other birds, is also generally associated with wetlands and open areas, such as cropland and grassland. The peregrine falcon nests in northwestern Colorado during the summer; however, no nests have been recorded in the SSA (Albee, 1990).

The black tern is an insectivorous species that nests in marshes, sloughs, and wet meadows. It forages in open meadows, marshes, and freshly plowed fields, frequently following the plow (Ehrlich *et al.*, 1988). Both nesting and prime foraging habitat for this species are absent from the CGSs.

The ferruginous hawk is a species of semi-arid lands, primarily semi-arid grasslands. The hawk specializes in hunting rodents and rabbits, only occasionally taking birds or reptiles. Their preferred nesting sites are junipers at the interface of pinyon-juniper and desert shrub communities. The hunting patterns vary but emphasize short or low flights. Their usual hunting pattern involves low flights over open ground in which the bird flaps its wings several times and then glides, although they occasionally hunt by hovering, and on rare occasions by soaring (Herron *et al.*, 1985). They also will forage from perches or from flight altitudes up to 100 meters above the ground (Johnsgard, 1990). Nesting habitat is absent from the CGSs, but the hawk could forage on the CGSs from nearby wooded hills.

The Columbian sharptailed grouse is a subspecies of the common sharptailed grouse (*Tympanuchus phasianellus*) and their habitats are the same (Carter, 1992). The sharptailed grouse is an herbivorous and insectivorous, ground-nesting bird of grasslands, shrublands, and forest clearings. It forages on the ground and spends relatively little time in flight. When it is in flight, the flights are notably rapid and straight (Ehrlich *et al.*, 1988). Habitat for this species is present on the CGSs, most of which are grazing lands covered with fescue grass, sagebrush, and small cacti.

Very little is known of the natural history of the fringed-tailed myotis (Maser *et al.*, 1981). It is a highly colonial bat species that prefers to roost in caves, mines, rock crevices, and buildings. Females bear one young per year and roost separately from the males during the summers (Maser *et al.*, 1981; Burt and Grossenheider, 1976). The maternal colonies apparently break up during the fall, but subsequent movements are unknown (Maser *et al.*, 1981). The habitat for the fringed-tailed myotis is absent from the CGSs.

The spotted bat ranges throughout the Intermountain West in a variety of habitats, including ponderosa pine forests and caves. It is most frequently found in California, Arizona, New Mexico, southern Colorado, and southern Utah; its most common habitat is rough, desert-like terrain with suitable roosting cliffs and with a water source within a few miles. The preferred daytime roosts are horizontal rock crevices or vertical rock surfaces of high cliffs and canyons, generally at elevations of 6,000 to 8,000 feet. Moths are the preferred prey (Allen, 1979; Barbour and Davis, 1969; Zeveloff and Collett, 1988). The habitats required for this species are absent from the CGSs.

In its larval stage, the Great Basin silverspot butterfly feeds only on bog violets (*Viola nephrophylla*), which are found near springs and seeps (Ireland, 1992). Habitat for the violet, and therefore for the butterfly, is absent from all of the CGSs.

Hamilton milk-vetch is currently known only at Dinosaur National Monument where it is found on sandy soils, in juniper-mountain mahogany woodlands, at the interstices of outcrops of the Morrison formation, and on soils derived from the Duchesne River formation (Ireland, 1992). Habitat for the Hamilton milk-vetch is absent from the CGSs, which are all in sagebrush-grassland vegetation or in agricultural use and have loamy soils derived from the Browns Park or Fort Union formations.

Gibbons beardtongue is reported to occur on sandy soils associated with big sagebrush or mountain mahogany. It grows in soils derived from the Browns Park and Green River formations (Ireland, 1992). This habitat is absent from the CGSs, which have loamy rather than sandy soils and have sagebrush-grassland vegetation or are in agricultural use.

Ownbey's thistle occurs along the Yampa and Green rivers on sandy soils. It is a species of riparian areas and moist canyons but is occasionally found in alcoves, seeps, or under shady cliffs in association with columbines. It occurs on soils derived from the Morgan and Welber formations (Ireland, 1992). These riparian and moist cliff and canyon habitats are absent from the CGSs, and the soils of the CGSs are loamy, not sandy.

Colorado state-listed threatened and endangered species or species of concern potentially occurring in Moffat County include the red-headed woodpecker (*Melanerpes erythrocephalus*), the great blue heron (*Ardea herodias*), the long-billed curlew (*Numenius americanus*), and the Colorado squawfish (*Ptychocheilus lucius*). Both the red-headed woodpecker, thought to occasionally reside in the area during the summer, and the long-billed curlew, which migrates through northwestern Colorado, are rare to this region and are only transient residents of Moffat County. The great blue heron is known to roost in the Elkhead Creek and Yampa River junction immediately east of the Routt County line, approximately 8 miles east of the nearest CGS. Although the habitat of these three birds is along rivers and creeks such as the Yampa River Basin and its tributaries, the last sighting of a long-billed curlew was in an agricultural field in August 1971. The red-headed woodpecker was last seen in 1972. The Colorado squawfish was last observed in 1974 (CNAP, 1989).

The SSA contains no national or state refuges, preserves, or sanctuaries. The closest national wildlife refuges are Browns Park, approximately 25 miles west of Craig in the town of Maybell, and the Arapaho National Wildlife Refuge, located 70 miles northeast of Craig, near the town of Walden (USFWS, 1986; USGS, 1988). All sites except the Scott site (CGS-2) are within an area designated by the BLM as critical habitat for mule deer winter range (Secrist, 1991).

Soils in Moffat County can be invaded by noxious weeds once the land has been disturbed. The State of Colorado has passed legislation effective January 1, 1991, requiring control of noxious weeds by spraying, mowing, or soil sterilization techniques. Moffat County has a County Weed Management Plan that outlines steps to be taken to control about 17 species of noxious weeds. If any of these weeds are present on a site, a

weed control plan will be submitted to the Moffat County Undesirable Plant Management Commission for approval (Brannan, 1992).

3.1.3 Socio-Cultural Setting

The Yampa River Valley was home and hunting ground to the Ute and Arapaho tribes long before the first Europeans arrived. These tribes shared the cultural patterns of the other Great Basin tribes and were closely adapted to their arid environment. Small family bands moved through an annual cycle, exploiting food resources in the valleys and adjacent mountains. The quest for food was the underlying basis of the Great Basin culture and society. Food supplies were seldom adequate to permit groups of any size to remain together for more than a few days, so social organization was fluid (EBI, 1974; Davidson, 1991).

Euro-American hunters and trappers were lured to the area in the early 1800s by the region's abundant wildlife. By 1838 the United States had established a fort on the Green River at Browns Hole, 70 miles west of the SSA near the Utah border, in what is now Dinosaur National Monument. The Ute and Arapaho tribes were displaced by the Spanish explorers from Mexico in search of cities of gold and silver. By the 1840s, the Spanish frontier extended as far north as the Arkansas River. Settlers moved onto the western slopes of the Rocky Mountains during the mid-1800s, taking over the former Ute Indian reservation land at White River as they spread toward Utah (Davidson, 1991).

By the 1870s and early 1880s, cattlemen had herds in Routt, Rio Blanco, and Garfield counties. No sheep ranchers made homes in the region, but Wyoming sheep were gradually moved southward along the mountain slopes for summer range. Boundaries between sheep and cattle country were drawn and often violated. The sheep ranchers' practices of overgrazing and fencing led to violent clashes with cattlemen, bringing heavy loss of life and property on both sides. By the early 1900s, the Federal Government had begun to regulate grazing rights on forest land and reserves. Moffat County, created out of Routt County, was established largely to provide an area for sheep grazing; wide areas of below-average natural habitat in Moffat County are the result of overgrazing (Davidson, 1991).

Interest in gold mining began in northwestern Colorado with the John Wesley Powell expedition of 1868. By the early 1900s, David H. Moffat, Jr., a prominent Denver banker for whom the county is named, invested in many new mining camps and connected them to processing and trade centers via a new railroad system. Moffat's investments in rail caused tremendous growth in the mining industry. As gold reserves dwindled in the early 1900s, interest in oil and coal development followed (Davidson, 1991). Today both coal and natural gas are still mined commercially (Hook, 1991).

The Colorado State Historic Preservation Officer (SHPO) was consulted as required by the National Historic Preservation Act (16 USC 470, *et seq.*). The Colorado SHPO indicated that several cultural resource surveys had been conducted in the area, but that none had revealed any resources eligible for the National Register of Historic Places (NRHP). However, due to the potential for unidentified resources, the Colorado SHPO recommended that a cultural resources inventory be conducted to determine the presence of cultural resources at the candidate sites (Appendix C, Collins, 1989, pages C-7 and C-8 of this EA).

In March and April 1990, a Class III archaeological survey was conducted on all five CGSs, including a literature and records search of archaeological and historic properties covering an area within 1 mile of each CGS and an on-site archaeological survey of each CGS. The literature and records search revealed one previously recorded archaeological site, but no properties potentially eligible for listing on the NRHP were found (CASA, 1990). The on-site archaeological survey was conducted by a professional archaeologist, qualified in the State of Colorado, using approximately 50-foot (15-meter) parallel pedestrian transects. No archaeological resources, prehistoric or historic, were located on any of the CGSs (CASA, 1990).

For reasons discussed in Section 4.8.1.3, beginning on page 4.8-2 of the FEIS, historic structures that occur within 1.5 miles of a CGS are potentially subject to adverse visual impacts from the relay node facility. The archival data search indicated the only site in the SSA that is listed on the NRHP is David Moffat's private rail car, the "Marcia," located in the town of Craig, more than 1.5 miles from any of the CGSs. No other properties within the

SSA are listed or eligible for listing on the NRHP (NRHP, 1989). The cultural resource field inventory revealed no potentially eligible structures (CASA, 1990).

In compliance with the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Bureau of Indian Affairs (BIA) was consulted in order to locate tribes associated with the project area (Harrill, 1992). The BIA indicated that the Utes and the Unitah and Ourays are the only federally recognized tribes in northwest Colorado associated with the project area. Based on BIA recommendations, the Southern Ute Tribal Council, the Ute Mountain Ute Tribal Council, and the Skull Valley Executive Committee of the Unitah and Ouray Agency were notified of the GWEN project and information was requested regarding traditional, religious, or sacred sites within the SSA. After reviewing the material on the GWEN project, the Chairman of the Ute Mountain Ute Tribal Council indicated that the tribe had no concerns (House, 1991). Following an historic records search and review by the Southern Ute Tribal Council, it was determined that no Native American cultural or religious resources would be affected by a GWEN facility (Cloud, 1991). The Chairman of the Skull Valley Executive Committee of the Unitah and Ouray Agency stated that his tribe had no concerns about the GWEN project (Bear, 1993).

Land use in the SSA is predominantly agricultural, with cultivated crops and rangeland accounting for 35 percent of the land in Moffat County (Census Bureau, 1988). Hay and wheat are the primary cultivated crops; sheep and cattle constitute the main ranching operations (Davidson, 1991). Coal is also mined in the region, and there are drilling operations for natural gas and some oil (Hook, 1991). Approximately 25 percent of the land in Moffat County is administered by the BLM and has been left uncultivated to preserve the natural biota and indigenous deer, elk, and antelope populations. Most of Moffat County is zoned Agricultural and Rural Highway, a zoning designation that places no height restriction on towers (Baker, 1989).

Sources of ambient noise are limited primarily to the operation of farm equipment and to traffic. As described in Section 3.5.3, beginning on page 3.5-1 of the FEIS, local ordinances typically set maximum noise level limits at 70 to 75 dBA for land under agricultural use; however, Moffat County does not have a local noise ordinance (Baker, 1991).

The population of Moffat County was 12,700 in 1986, a decline of over 3 percent since 1980 (Census Bureau, 1988). The 1990 census is expected to reflect a continued population decline throughout the late 1980s. Moffat County's major products are lamb, wool, beef, wheat, coal, and electricity. The Colorado-Ute Craig Station, a coal-fired power plant south of Craig, is the largest power plant in Colorado, generating 1,264 megawatts of power and supplying the community with approximately $10 million per year plant payroll. Other industries include natural gas production, some limited oil drilling operations, and tourism (Davidson, 1991). The 1988 estimated per capita income was $13,090 in Moffat County, compared to $16,459 in the state. The unemployment rate was 12.9 percent in Moffat County in 1986, compared to 7.4 percent at the state level (Census Bureau, 1988).

The only community in the SSA is the town of Craig, population 9,240 in 1987 (Rand McNally, 1989). Outside of Craig, the region is sparsely populated. The transportation system is a network of one- and two-laned paved, gravel, and dirt roads. U.S Highway 40 runs east-west and cuts the SSA in half. State Highway 13 runs southwest to northeast, intersecting U.S. Highway 40 at Craig. The Rio Grand Railroad runs east-west through the SSA parallel to the Yampa River and U.S. Highway 40. Craig-Moffat Airport is located approximately 1.5 miles southeast of Craig.

Recreational resources within the SSA are limited primarily to the Craig city limits. Craig has four parks, a 335-acre multiple-use county park, five swimming pools, a wave pool, and an 18-hole golf course that winds along the banks of the Yampa River, just south of town. Elkhead Reservoir, on the SSA's northeastern border, is the largest body of water in the area and is a popular location for water sports.

Moffat County and federal recreation areas outside of the SSA provide opportunities for hiking, camping, fishing, hunting, and boating, as well as snowmobiling and cross-country skiing in the winter. Dinosaur National Monument is 50 miles west of the SSA; Browns Park is 80 miles to the northwest; Routt National Forest is 10 miles to the northeast. White National Forest is 10 miles to the south and Flat Top Wilderness Area is 30 miles south.

The visual setting is rural in character. The topography varies from rolling hills to steep escarpments, with many bluffs, plateaus, and valleys. Elevations range from 6,400 to 7,800 feet above MSL, with buttes and mountains dotting the landscape, creating a moderately complex skyline, as defined in Section 4.8.1.3, page 4.8-10 of the FEIS. Roads and power lines meander through the treeless hills creating irregular patterns. Farmsteads, oil wells, occasional water towers, and telephone and electrical poles provide vertical contrast to the otherwise constant rolling of the hills. The flood basin of the Yampa River consists primarily of high density vegetation that provides a lush, soft, and colorful diversity in an otherwise constant environment.

3.2 Alternative 1: Scott Site (CGS-2)

The Scott site is a flat tract of land at the intersection of County Roads 7 and 31. Soils on the site are mostly Battlement fine sandy loam, on 0 to 5 percent slopes, with small areas of Yamo loam and Battlement saline. These are deep, well-drained soils with no hazard of flooding. Permeability and runoff are moderate. These soils are mildly to moderately alkaline, with pH values ranging from 7.4 to 8.4. Depth to the seasonally high water table is greater than 6 feet (SCS, 1988). The soil is not designated as prime farmland (Hasken, 1989).

The nearest surface water is a 4-foot-deep intermittent drainage course called Cedar Mountain Gulch, which crosses the southwestern corner of the site, 20 feet inside of the site boundary but 140 feet outside of the ground plane. The drainage course is a seasonal, meandering drainage handling rainwater runoff that has carved its way into the alluvial benchland of sandy loams. It originates approximately 2.5 miles northwest of the CGS and meanders for approximately 2.5 miles south of the CGS before reaching the Yampa River. A small area west of the drainage course is included in a 100-year floodplain. Vegetation in and around the drainage is composed of common grasses and sagebrush. This stream does not meet the federal criteria for a wetland (FICWD, 1989). There is no hydrophytic vegetation, the soils are not hydric (SCS, 1987), and the depth to the seasonally high water table is greater than 6 feet (SCS, 1988).

The site has ground cover of indigenous grasses and is currently used for grazing.

The Craig town limits are located approximately 1.5 miles southeast of the site. The closest permanent residential area of the town is 2 miles southeast of the site.

3.3 Alternative 2: Stehle Site (CGS-3C)

The Stehle site is a relatively flat tract south of County Road 31, with an uphill slope of 4 to 6 percent away from the road. Soils consist of Evanston-Forell loam, a deep, well-drained soil with medium runoff and moderate hazard of water erosion. Evanston-Forell soils are mildly to moderately alkaline with pH values ranging from 7.4 to 8.4. Depth to the seasonally high water table is greater than 6 feet (SCS, 1988). The soil is not designated as prime farmland (Hasken, 1989).

The nearest surface water is an intermittent drainage course handling rainwater runoff 700 feet from the northwest corner of the site. The Yampa River Basin is 4.5 miles south of the site.

The site is presently used to grow wheat; there are no native trees or vegetation. The site is adjacent to an area reserved for elk, antelope, and mule deer migration. The surrounding area is largely unfenced, with natural vegetation of wheatgrass, junegrass, and sagebrush that provides a preferred habitat for mule deer. However, fences surrounding the property on which the site is located lower the habitat quality of the site.

The town of Craig is approximately 5 miles to the south.

3.4 Alternative 3: BLM Site (CGS-11A)

The BLM site is a relatively flat tract south of County Road 174, with a gentle knoll on the eastern side. The soils are mostly Berlake sandy loam, a deep, well-drained soil formed in residuum and alluvium derived mostly from sandstone. Small areas of Rock River soils, Weed soils, and Ironsprings soils are also present on the site. These are also well-drained

soils with moderate permeability and moderate hazard potential for both water erosion and soil blowing. All soils on the site are neutral to moderately alkaline with pH values ranging from 6.6 to 8.4. Depth to the seasonally high water table is greater than 6 feet (SCS, 1988). The soil is not designated as prime farmland (Hasken, 1989).

The nearest surface water is an intermittent drainage course handling rainwater runoff 800 feet from the southwest corner of the site. A similar drainage course is located 900 feet north of the site.

The site is an open field of native sagebrush, cactus, and bunchgrasses presently used for grazing.

An acid rain monitoring station is located 0.25 mile east of the site. The town of Craig is 9.5 miles to the east.

3.5 Alternative 4: Fagg I Site (CGS-14A)

The Fagg I site is a relatively flat tract north of U.S. Highway 40 that slopes up toward the north from U.S. Highway 40 with a 2 to 5 percent slope and has a 2 percent slope across the front of the site from east to west. Soils are Berlake sandy loam, a deep, well-drained soil formed in residuum and alluvium derived mostly from sandstone, and Ironsprings loamy sand, also deep and well-drained, near the northern boundary of the site. Both have moderately rapid permeability and low water capacity. Runoff is slow, and the hazard of soil blowing is high. These soils are neutral to moderately alkaline with a pH range of 6.6 to 8.4. Depth to the seasonally high water table is greater than 6 feet (SCS, 1988). The soil is not designated as prime farmland (Hasken, 1989).

The nearest surface water is an intermittent drainage course handling rainwater runoff that cuts across the northwest corner of the CGS, 140 feet inside of the site boundary but 20 feet outside of the ground plane. It originates approximately 0.5 mile northeast of the CGS and meanders approximately 1.5 miles west before reaching Sand Spring Creek. Vegetation in and around the drainage is composed of common grasses and sagebrush. This stream does not meet the federal criteria for a wetland (FICWD, 1989). There is no

hydrophytic vegetation, the soils are not hydric (SCS, 1987), and the depth to the seasonally high water table is greater than 6 feet (SCS, 1988).

The site is an open field of sagebrush, wheatgrass, and broad-leaved annuals, but seasonal grazing by antelope, elk, and deer has limited the amount of vegetative cover.

The town of Craig is 7.5 miles to the east.

3.6 Alternative 5: Fagg II Site (CGS-14B)

The Fagg II site is a relatively flat tract south of U.S. Highway 40 with an uphill slope of 2 to 7 percent. Soil is Ironsprings loamy sand, a deep well-drained soil with moderately rapid permeability and low water capacity. Runoff is slow, and the hazard of soil blowing is high. Depth to the seasonally high water table is greater than 6 feet. Ironsprings soil is neutral to moderately alkaline with a pH range of 6.6 to 8.4 (SCS, 1988). The soil is not designated as prime farmland (Hasken, 1989).

The nearest surface water is an intermittent drainage course handling rainwater runoff 400 feet from the northwest corner of the site. A similar drainage course is located 800 feet from the southeast corner of the site.

The site is an open field with sagebrush, wheatgrass, and annuals, presently used for grazing.

The town of Craig is approximately 7.5 miles to the east.

4.0 ENVIRONMENTAL CONSEQUENCES OF ACTION ALTERNATIVES

This section discusses the potential impacts of the GWEN project on the environmental setting of the five CGSs in northwestern Colorado. Several impacts that would be common to some or all of the action alternatives are discussed in Section 4.1 of this EA. Impacts that are unique to each action alternative are discussed in Sections 4.2 through 4.6 of this EA. There would be no significant impacts on any of the five sites, as indicated in Sections 4.2 through 4.6 of this EA.

4.1 Common Features

Presented below is information on the physical, biological, and socio-cultural impacts common to some or all of the action alternatives.

4.1.1 Physical

Impacts from **construction** activities would not be significant. Construction would require localized earth-moving, including excavation and backfilling for placement of foundations and guy-wire anchors. Less than 3,800 square feet would be covered with concrete and gravel for the tower base and the equipment area enclosures. Similar coverage would be required for on-site access roads and parking; incidental activities during construction would disturb a similar amount. In total, about 0.25 acre would be occupied by foundations and the on-site access roads. Construction of the off-site access road and installation of utility lines would have no significant impacts because they would cover no more than 1,250 square feet of land along the previously graded public highway right-of-way.

The ground plane would be installed using machines that bury wire approximately 1 foot below the surface with minimal disturbance of the soil surface. This process would require moving a small tractor or similar equipment over much of the 11-acre site, but would not significantly disturb the existing vegetation or create a significant erosion hazard.

Impacts to **mineral resources** would be minor, as indicated in Section 4.1.1.4, page 4.1-2 of the FEIS. Although there are coal resources located under the CGSs in northwestern Colorado, they are of secondary quality and are close to populated areas. In addition, there are abundant superior coal reserves to the south that are currently being mined. For these reasons, mining of the coal reserves under the CGSs is unlikely. Some natural gas reserves could be found under three of the CGSs (CGS-11A, CGS-14A, and CGS-14B) and oil reserves might be present (Hook, 1991). If resources are present under the CGSs, access to them is unlikely to be restricted, due to the small size of the GWEN site. If access is restricted, development of the site would only deny access to a small portion of those resources for the lifetime of the project and would not result in any significant impacts.

Significant impacts on **paleontological resources** are not anticipated because fossils are unlikely to occur on any candidate site (Stuckey, 1989). Sites containing paleontological resources are often found where rock outcrops and vertical terrain features expose sedimentary rocks. These exposures are not found on the foothills and upland benches that were chosen for CGSs, and, given the rarity with which fossils occur, it is highly unlikely that significant resources would be found at the sites under consideration. However, if any fossils are found during construction, work that might affect them would be suspended while the Colorado Geological Survey is notified and the significance of the find is evaluated. The BLM will also be notified if fossils are found on the BLM site (CGS-11A).

Erosion and increase in storm water runoff would not be significant. All sites have slopes of 7 percent or less, so any required grading to level the site would be minimal. In addition, standard measures for erosion control would be used during and after site construction, including replanting the site.

None of the CGSs is located within a **100-year floodplain** (FIA, 1982 and 1984).

No **prime farmland** would be removed from production for the project, because none of the sites contains designated prime farmland (Hasken, 1989).

No significant impacts on **drinking water** are expected, as discussed in Sections 3.2.4.1 and 4.2.1.1, pages 3.2-2 and 4.2-3 of the FEIS. Corrosion of the ground plane is not anticipated to raise copper concentrations in any aquifer or surface water body by more than 20 micrograms per liter (µg/l). This represents 2 percent of the maximum allowable copper concentrations permitted by the Environmental Protection Agency (EPA) for raw water sources for potable water supply (EPA, 1985). The EPA standard is intended to maintain the aesthetic properties that relate to public acceptance of drinking water and is not related to public health. A threshold for the effects of copper on human health has not been determined (EPA, 1985).

Impacts on **surface water or wetlands** that support aquatic plants and animals would not be significant. Potential impacts could occur when the ground plane is less than 300 feet from surface water, if the soil is acidic, or the depth to the seasonally high water table is less than 3 feet from the ground plane (4 feet from the surface), as discussed in Section 4.2.1.1, page 4.2-3 of the FEIS. All five CGSs have neutral to alkaline soils (pH greater than 6.5) and a seasonally high water table greater than 3 feet from the ground plane. Under these conditions, the potential for transport of copper away from the immediate area of the ground plane would be negligible, even though an intermittent drainage course runs across the corner of two CGSs (CGS-2 and CGS-14A).

Impacts on **air quality** would not be significant. Temporary but insignificant increases in air pollutant emissions, including fugitive dust, would occur during construction, primarily from greater use of heavy machinery than would be required in normal farming operations. During operation of the BUPG at 100 percent load, total yearly emissions from the BUPG would be less than 350 pounds per pollutant, as described in Section 2.1.2 of this EA. These are well below the standards set by the State of Colorado (Administrative Rules of Colorado, 16.8.1102), which require permits for facilities emitting any single regulated substance at the rate of 25 tons per year. Hence, the project would not result in violation of Colorado Primary and Secondary Ambient Air Quality Standards. Permits will not be required under Code of Colorado Regulations, Volume 5, Part 14, September 10, 1970. However, an air pollution emission notice is required to demonstrate exemption from regulation (Miller, 1989).

4.1.2 Biological

The project would have no significant impacts on **wildlife and wildlife habitat**. Each CGS is an agricultural field that is used for cash crops, grazing, or is uncultivated, and each is far from extensive areas of woodlands, ponds, lakes, or perennial streams. The USFWS has identified no critical habitat within the project area (Appendix C, Noonan, 1989, pages C-4 and C-5 of this EA). However, all sites except CGS-2 are within an area designated by the BLM as critical habitat for mule deer winter range. Although mule deer can be under extreme stress from severe climatic conditions during the winter months (Secrist, 1991), timing of GWEN construction will be coordinated with the BLM to protect the mule deer from added stress during these periods.

Bird collisions with the tower may occur but are not expected to be significant. Section 4.4.1.5, page 4.4-5 of the FEIS states that the majority of bird collisions occur in adverse weather conditions when the visibility of man-made structures is obscured and birds may be forced to lower their flight level. Generally, songbirds (passerines) are more likely to collide with a tower or the guy wires than are raptors or waterfowl (Avery *et al.*, 1980). Areas with high concentrations of bird flight activity, such as feeding and nesting habitats, prominent topographical features that could serve as navigational aids, known migration corridors, and raptor roosting areas, were avoided during site selection.

No federally listed **threatened or endangered species** would be affected. This determination was made after informal consultation with the USFWS in compliance with Section 7 of the Endangered Species Act of 1973 as amended (16 USC 1531, *et seq.* at 1536) (Appendix C, Chu, 1990, page C-6 of this EA). The only federally listed threatened or endangered species likely to be in the project area are the bald eagle and the black-footed ferret. The USFWS also had concerns about the federally endangered whooping crane and peregrine falcon. Although the bald eagle winters along the Yampa River and connecting gulches and the whooping crane is associated with the Grays Lake flock which migrates through the Yampa Valley Basin, these birds prefer open waters for foraging. Therefore siting the CGSs on dry-upland benches away from the Yampa River significantly reduces the potential for significant impacts on either of these species (Carlson, 1989). No

peregrine falcon nests have been recorded in the Craig area (Albee, 1990). There are no known prairie dog towns near the SSA (Bauman, 1991), and therefore no potential for black-footed ferrets.

In addition, no significant impacts are expected on any of the nine candidate species for federal listing.

The wetland habitats required by breeding black terns are absent from the CGSs. In addition, the desert and perennial grassland vegetation found on the CGSs appears to be marginal to poor foraging habitat for this species. Therefore no significant impacts are expected.

Junipers, the preferred nesting sites for the ferruginous hawk, are absent from the CGSs, each of which is covered by sagebrush or grassland. However, the CGSs are near the base of juniper-covered hills and therefore might be the site of foraging by breeding birds. But given the brevity of the typical foraging flight and the use of perches, the probability is low that a foraging ferruginous hawk would be involved in prolonged pursuit of prey that might prevent detection of the tower and its wires in time to take evasive action. Thus, the tower is not expected to significantly impact either nesting or foraging activities.

No significant impacts are expected on sharptailed grouse habitat because the CGSs are sited in locally abundant habitat, and construction of the ground plane will leave the existing vegetation largely intact. Although an individual grouse could collide with the wires associated with the tower when in flight, the probability of such a collision is low because flights are relatively rare and the wires are widely spaced near the ground where the risk of a collision is greatest.

No significant impacts are expected on the fringed-tailed myotis or the spotted bat because the CGSs do not contain the bat habitat of rock outcrops, caves, fissures, or buildings. The CGSs are located on grazing land or agricultural fields with gentle slopes. In addition, if any bats were to forage within the vicinity of the tower, their sensitive echolocation system would protect them from collision with the tower.

No significant impacts are expected on the Great Basin silverspot butterfly because its habitat is absent from the CGSs. The bog violet that the larval butterfly feeds on is only found near springs and seeps and these are absent from the CGSs. All of the CGSs are located on well-drained soils with seasonally high water tables more than 5 feet below the surface.

No significant impacts are expected on Hamilton milk-vetch because its habitat is absent from the CGSs. Milk-vetch habitat is either sandy soil, woodlands, the interstices of outcrops of the Morrison formation, or soils derived from the Duchesne River formation. The CGSs are located on loamy rather than sandy soils and contain sagebrush-grassland vegetation or are in agricultural use.

No significant impacts are expected on Gibbons beardtongue because its habitat is absent from the CGSs. The beardtongue requires sandy soils associated with big sagebrush or mountain mahogany and the CGSs have loamy soil and have sagebrush-grassland vegetation or are in agricultural use.

No significant impacts are expected on Ownbey's thistle because its habitat is absent from the CGSs. The thistle requires sandy soils in moist canyons, seeps, or shady cliffs, and the CGSs are flat grazing or agricultural fields with loamy soils.

The Colorado Department of Wildlife concurs that there would be no significant impacts on state-listed species (Toolen, 1991).

The State of Colorado has passed legislation effective January 1, 1991, requiring control of noxious weeds by spraying, mowing, or soil sterilization techniques. Moffat County has a County Weed Management Plan that outlines steps to be taken to control about 17 species of noxious weeds (Brannan, 1992). If any of these weeds are present on the preferred site, a weed control plan will be submitted to the Moffat County Undesirable Plant Management Commission for approval.

4.1.3 Socio-Cultural

Local employment would be increased slightly, primarily through use of local subcontractors for earth-moving and possibly for some of the facility's maintenance.

Impacts on **community support systems** would not be significant because the relay node will be unmanned and will use modest amounts of power, comparable to that used by an average single-family house. Security needs will be met through agreements with local police officials to monitor the integrity of the site during routine patrols, as detailed in Section 4.6.1.1, page 4.6-1 of the FEIS.

Impacts on **land use** would not be significant. All candidate sites are zoned Agricultural and Rural Highways or designated for grazing by the BLM, and there are no local restrictions concerning development of the proposed GWEN facility. Care was taken in the site selection process to maintain setbacks from institutional uses such as schools, churches, recreational areas, and areas zoned residential. The tower would not *significantly affect property values* because non-noxious, nonresidential land uses, such as the proposed relay node, have no systematic effect on housing values, as stated in Section 4.7.1.3, page 4.7-8 of the FEIS.

Construction **noise** impacts would be temporary and insignificant. Operational noise from the backup generator would be less than 72 dBA at the site boundary. At 50 feet beyond the site boundary the noise level would drop below 65 dBA, as discussed in Section 2.1.2 of this EA. Although Moffat County has no noise ordinances, this noise level is within the standards typically set for residential and mixed residential/agricultural use (55 to 65 dBA), as stated in Section 3.5.3, page 3.5-2 of the FEIS. In addition, the BUPG would only operate at this noise level for 2 hours per week during testing and during commercial power outages.

Impacts on **public health and safety** would not be significant, as discussed in Sections 4.11 and 4.12, beginning on pages 4.11-1 and 4.12-1, respectively, of the FEIS. Shock and burn risks would be associated with the buildup of electrical charges on ungrounded metallic objects inside the inner exclusionary (8-foot) fence located approximately 20 feet

from the tower base. However, a grounded person within the outer exclusionary (4-foot) fence located approximately 330 feet from the tower base who touches an ungrounded object while the tower was transmitting would experience only a mild shock, sufficient to cause the individual to break contact but not cause harm. Furthermore, because the transmission periods would total between 6 and 8 seconds per hour during normal operations, the risk of even these mild shocks would be insignificant. Only a determined effort to enter the inner exclusionary zones, within the 8-foot fence, would put a person at increased risk of higher shock and a higher specific absorption rate, dependent on the period of prolonged grasping contact with an ungrounded metallic object. Fire hazards at the relay node facility would be low, as discussed in Section 4.12.1.1, page 4.12-1 of the FEIS. Radio-frequency emissions would not cause adverse health effects, as discussed in Section 4.4.1.6, pages 4.4-6 and 4.4-7 of the FEIS. Subsequent to the publication of the FEIS, further study confirmed the conclusion of the FEIS that there is no evidence of adverse effects of GWEN radio-frequency emissions on public health (NRC, 1992).

The relay node would operate in the LF band and therefore would not interfere with pacemakers, emergency communications, commercial and amateur radios, televisions, or garage door openers, as noted in Section 2.1.1.1, page 2-3 of the FEIS.

Impacts on **archaeological resources** would not be significant. The Colorado SHPO reviewed the cultural resource inventory and concurred with the determination that the GWEN project would not impact archaeological resources on the five sites surveyed (Appendix C, Sudler, 1990, page C-9 of this EA). If any archaeological resources are found during construction, work that might affect them will be suspended while the Colorado SHPO is notified, in accordance with the provisions of 16 USC 470, *et seq.*, at 470f.

Impacts on **historic properties** would not be significant. There are no properties within 1.5 miles of any CGS listed or eligible for listing on the NRHP (NRHP, 1989). The Colorado SHPO reviewed the cultural resources inventory and concurred with the determination that the GWEN project would not affect any historic structures (Appendix C, Sudler, 1990, page C-9 of this EA).

Significant impacts on **Native American traditional, religious, or sacred sites** are not anticipated. The BIA indicated that the Utes and the Unitah and Ourays are the only federally recognized tribes associated with the project area (Harrill, 1992). Based on BIA recommendations, the Southern Ute Tribal Council, the Ute Mountain Ute Tribal Council, and the Skull Valley Executive Committee of the Unitah and Ouray Agency were notified of the GWEN project and information was requested regarding traditional, religious, or sacred sites within the SSA. After reviewing the material on the GWEN project, the Chairman of the Ute Mountain Ute Tribal Council indicated that the tribe had no concerns (House, 1991). Following an historic records search and review by the Southern Ute Tribal Council, it was determined that no Native American cultural or religious resources would be affected by a GWEN facility (Cloud, 1991). The Chairman of the Skull Valley Executive Committee of the Unitah and Ouray Agency stated that his tribe had no concerns about the GWEN project (Bear, 1993).

Visual impacts associated with a GWEN tower are discussed in Sections 3.8 and 4.8, pages 3.8-1 and 4.8-1, respectively, of the FEIS. The significance of a visual impact would depend on the visual dominance of the GWEN facility and the sensitivity of the affected views. Visual dominance is the degree to which a GWEN facility would compete with other features of the existing landscape for the attention of the viewer. Section 3.8.4, beginning on page 3.8-3 of the FEIS defines four levels of dominance, called Visual Modification Classes (VMC):

- VMC 1, not noticeable: the tower would be overlooked by all but the most interested viewers

- VMC 2, noticeable, visually subordinate: the tower would be noticeable to most viewers without being pointed out but would not compete with other features for their attention

- VMC 3, distracting, visually codominant: the tower would compete with other features in the landscape for the viewer's attention

- VMC 4, visually dominant, demands attention: the tower would be the focus of attention and tend to dominate the view.

Visual sensitivity is a measure of the public's reaction to a proposed change of the affected view and is a function of the viewer's activity, awareness, goals, and values. Consequently, the more sensitive the view, the stronger will be the public reaction to any alteration of it. Areas defined in the FEIS as having high visual sensitivity include national and state parks; designated scenic routes; designated national, state, or local historic sites where setting is important to their historic significance; and travel routes providing access to these sites. Examples of areas having medium visual sensitivity would be locally popular, but undesignated, beaches or public use areas and the travel routes that provide primary access to them. Low visual sensitivity includes those views from sites, areas, travel routes, and sections of travel routes not identified as medium and high in sensitivity.

Significant visual impacts would occur if the relay node facility were to dominate or *codominate* (VMC 4 or 3) a high-sensitivity view or dominate (VMC 4) a medium-sensitivity view. If the relay node facility cannot be seen from medium-to-high sensitivity routes or areas, then visual impacts are not considered significant. Distance is the primary factor in determining visual dominance and therefore visual impacts. At distances greater than 3 miles, a GWEN tower would not be visible to the unaided eye. At 1.5 to 3 miles, the tower would be visually subordinate if noticeable (VMC 2) but more usually would not be noticed (VMC 1) because of its grey color and lack of mass. If a viewer at this distance actively sought the tower, it would appear as a thin vertical line on the horizon. Within 1.5 miles, the tower becomes a more important component of the view. In addition, other aspects of the tower's setting, such as focal point sensitivity, skyline complexity, competing feature interest, and topographic and vegetative screening, become important considerations in determining the level of visual impact.

USGS topographic maps and a windshield survey were used to determine whether high or medium sensitivity views were within 1.5 miles of the CGSs. Visual impacts would not be significant at any of the CGSs because there are no high or medium sensitivity views within 1.5 miles of the CGSs.

4.2 Alternative 1: Scott Site (CGS-2)

No significant irnpacts are expected.

4.3 Alternative 2: Stehle Site (CGS-3C)

No significant impacts are expected.

4.4 Alternative 3: BLM Site (CGS-11A)

No significant impacts are expected.

No significant impact is expected to the acid rain monitoring station east of the site. Any dust resulting from GWEN construction activity would be carried away from the site by prevailing winds out of the southwest (Secrist, 1991).

4.5 Alternative 4: Fagg I Site (CGS-14A)

No significant impacts are expected.

4.6 Alternative 5: Fagg II Site (CGS-14B)

No significant impacts are expected.

4.7 No Action Alternative

No environmental impact would result from adoption of the no action alternative.

5.0 REFERENCES

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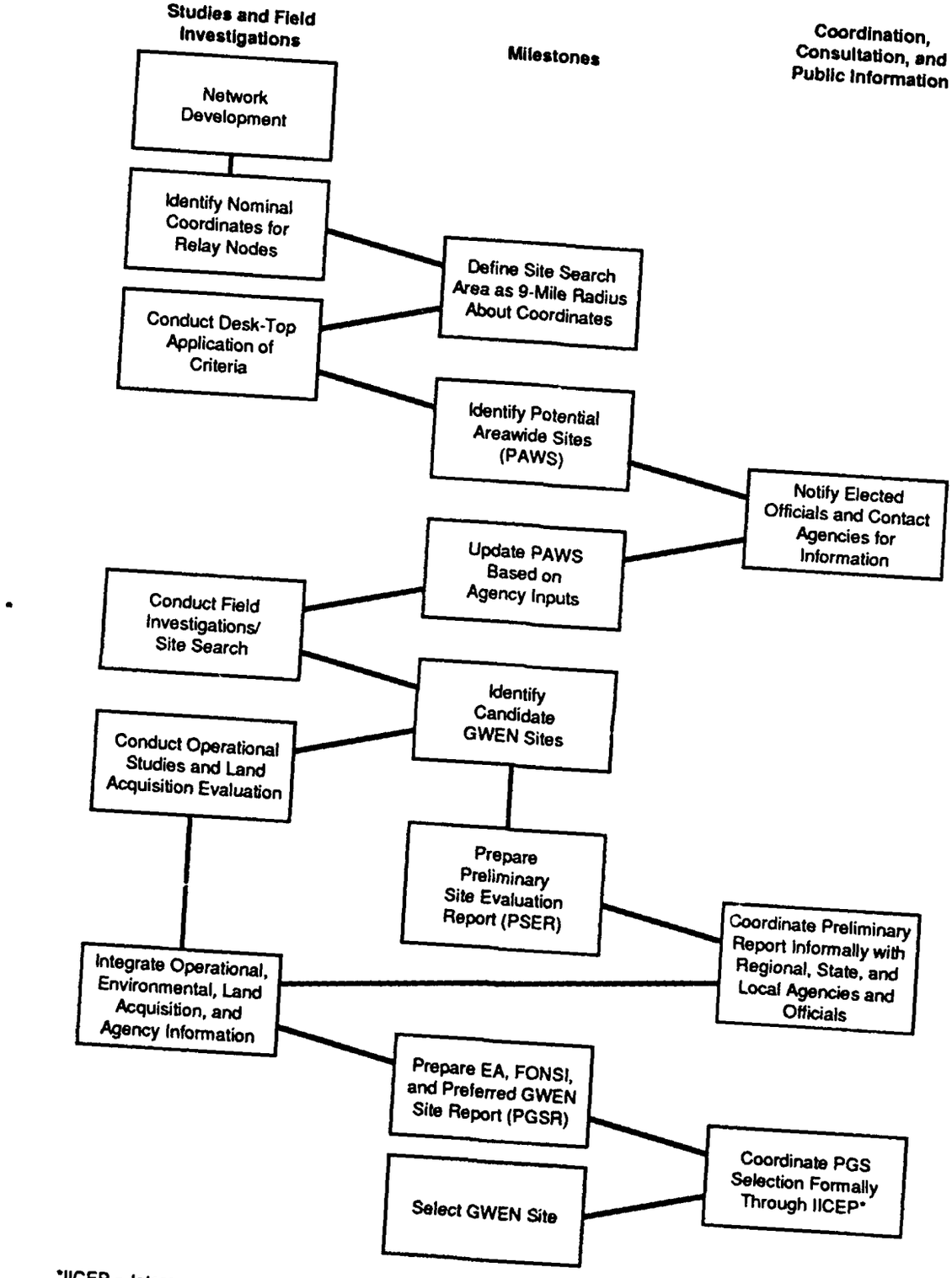
APPENDIX A

SITE SELECTION PROCESS

SITE SELECTION PROCESS

Figure A.1 of this EA shows the sequence of events during the selection of individual GWEN sites. Figure A.2 of this EA describes the screening process used during the field investigation to choose the candidate GWEN sites (CGSs). The environmental siting criteria applied in the site selection process are defined in Tables 5-1 and 5-2, pages 5-7 through 5-14 of the FEIS.



*IICEP = Interagency/Intergovernmental Coordination for Environmental Planning.

FIGURE A.1 GROUND WAVE EMERGENCY NETWORK SITE SELECTION PROCESS

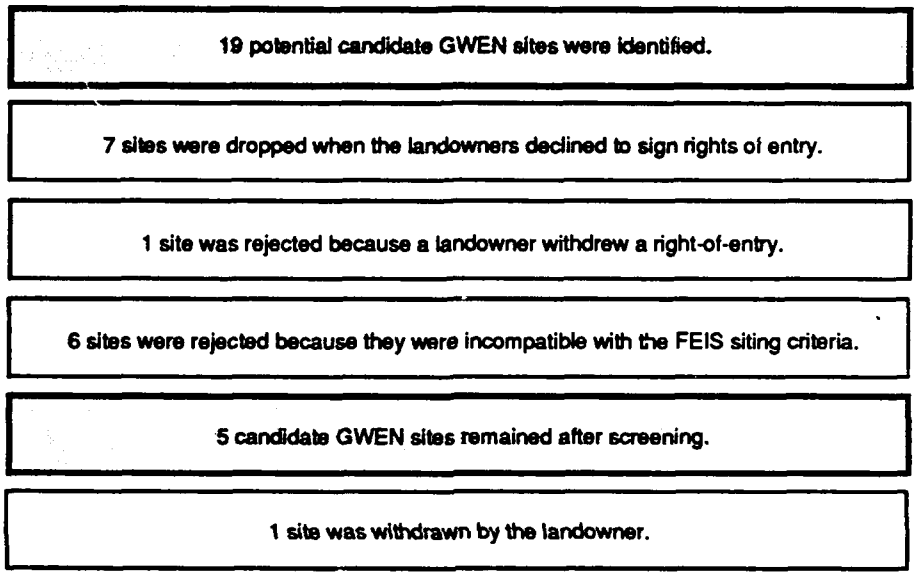


FIGURE A.2 RESULTS OF USING FEIS SITING CRITERIA TO SCREEN POTENTIAL CANDIDATE GWEN SITES IN THE NORTHWESTERN COLORADO SITE SEARCH AREA

APPENDIX B

TOPOGRAPHIC SETTINGS OF CANDIDATE GWEN SITES

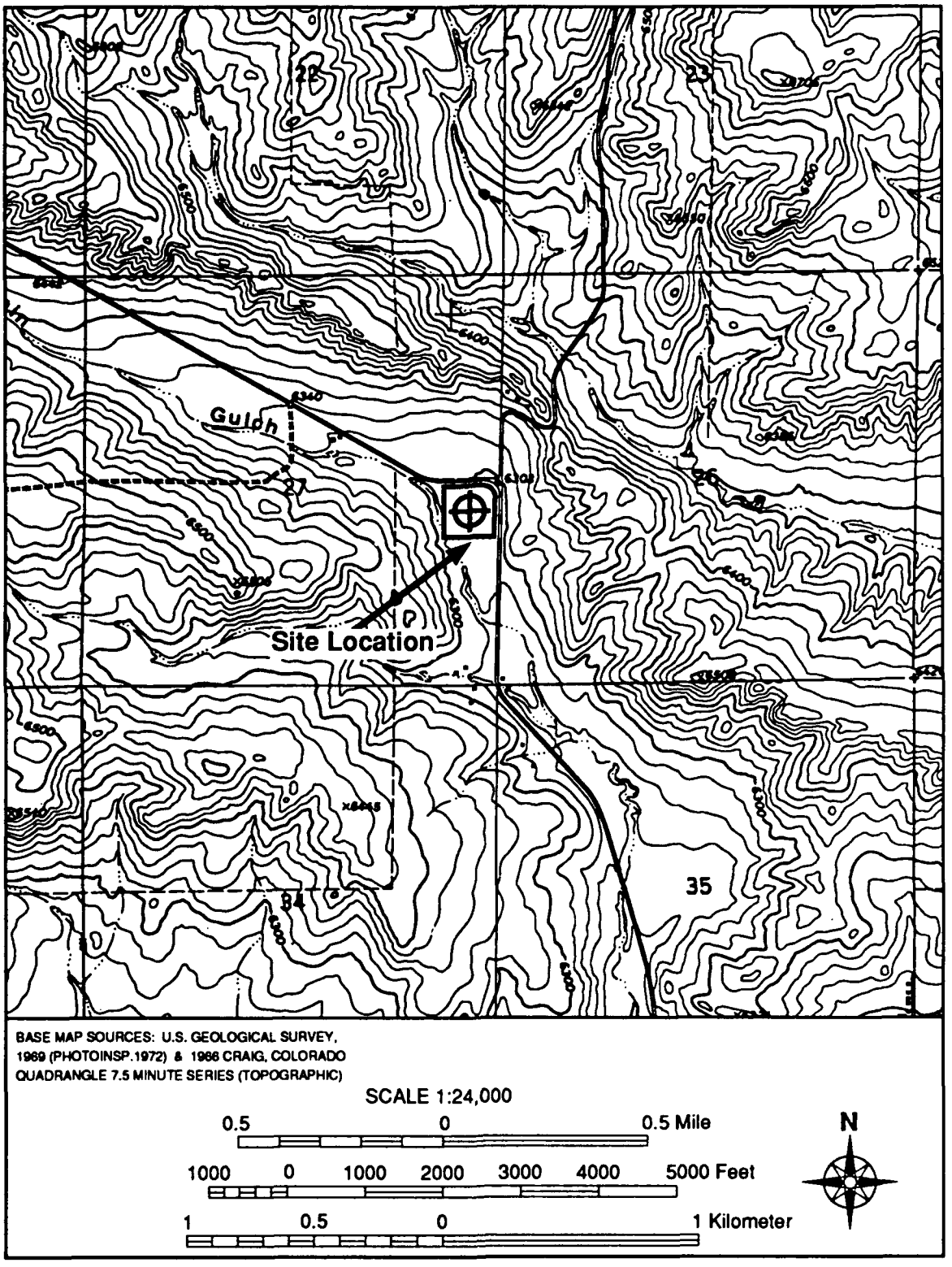


FIGURE B.1 TOPOGRAPHIC SETTING OF THE SCOTT SITE (CGS-2)

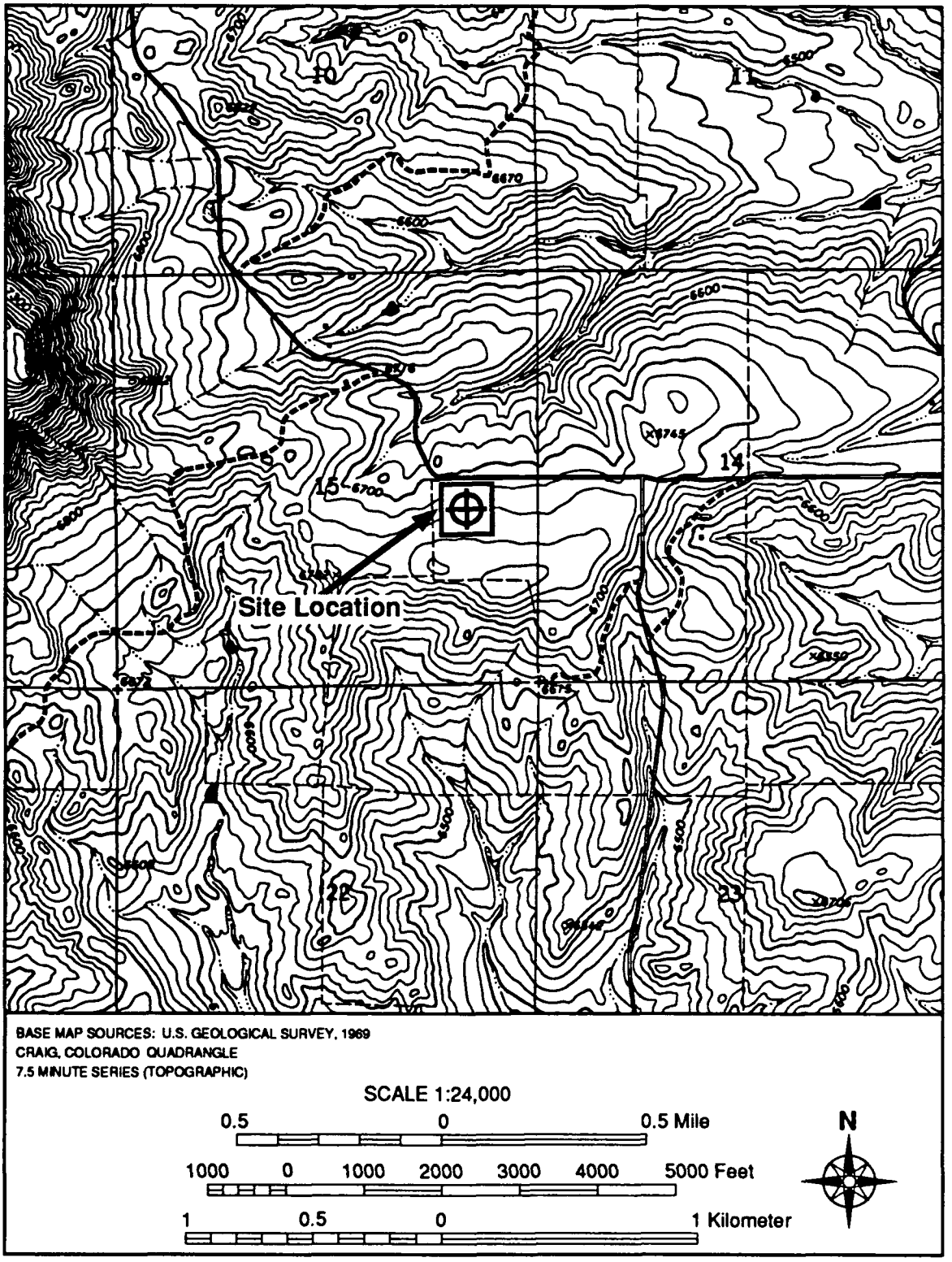


FIGURE B.2 TOPOGRAPHIC SETTING OF THE STEHLE SITE (CGS-3C)

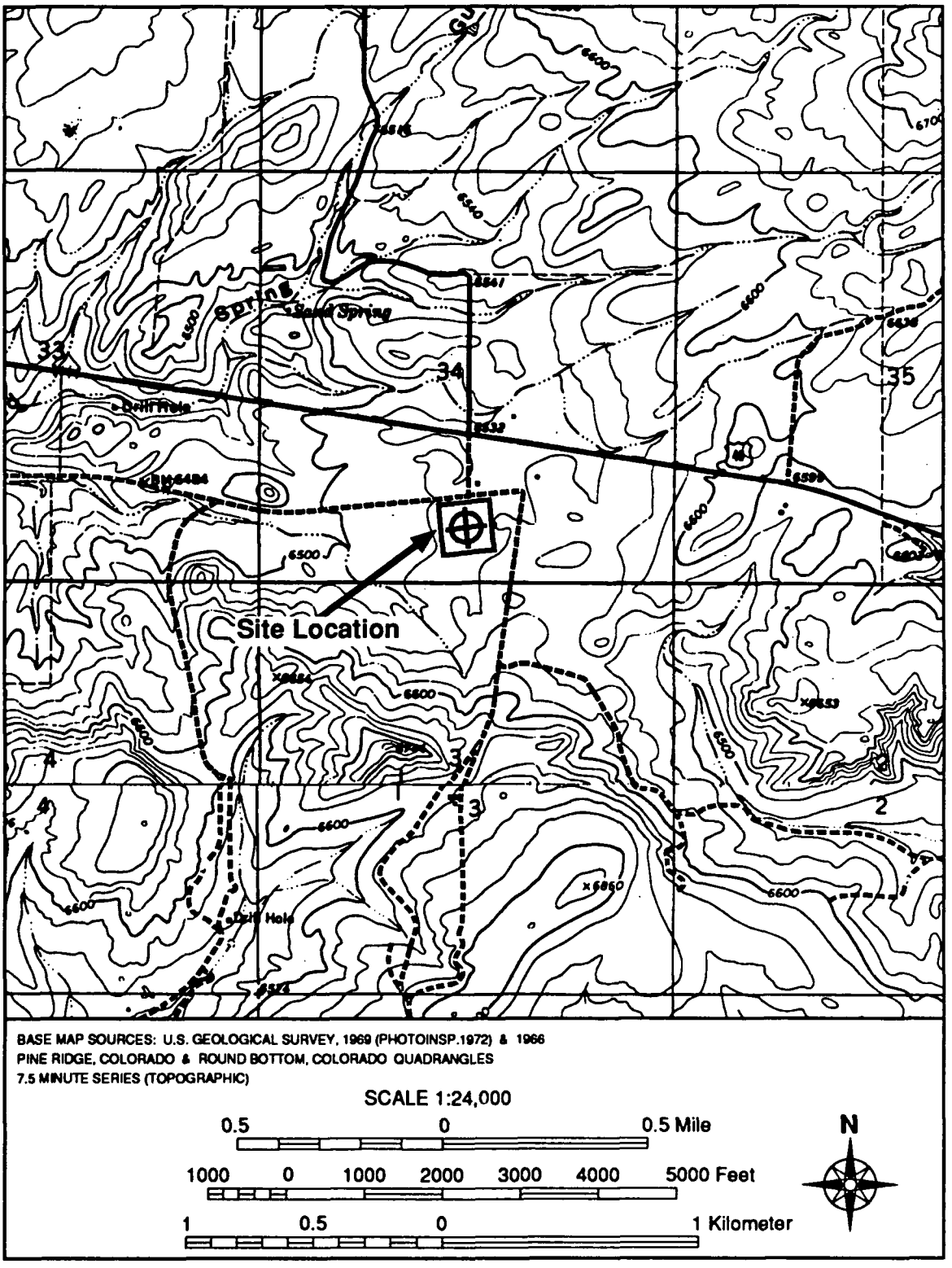


FIGURE B.3 TOPOGRAPHIC SETTING OF THE BLM SITE (CGS-11A)

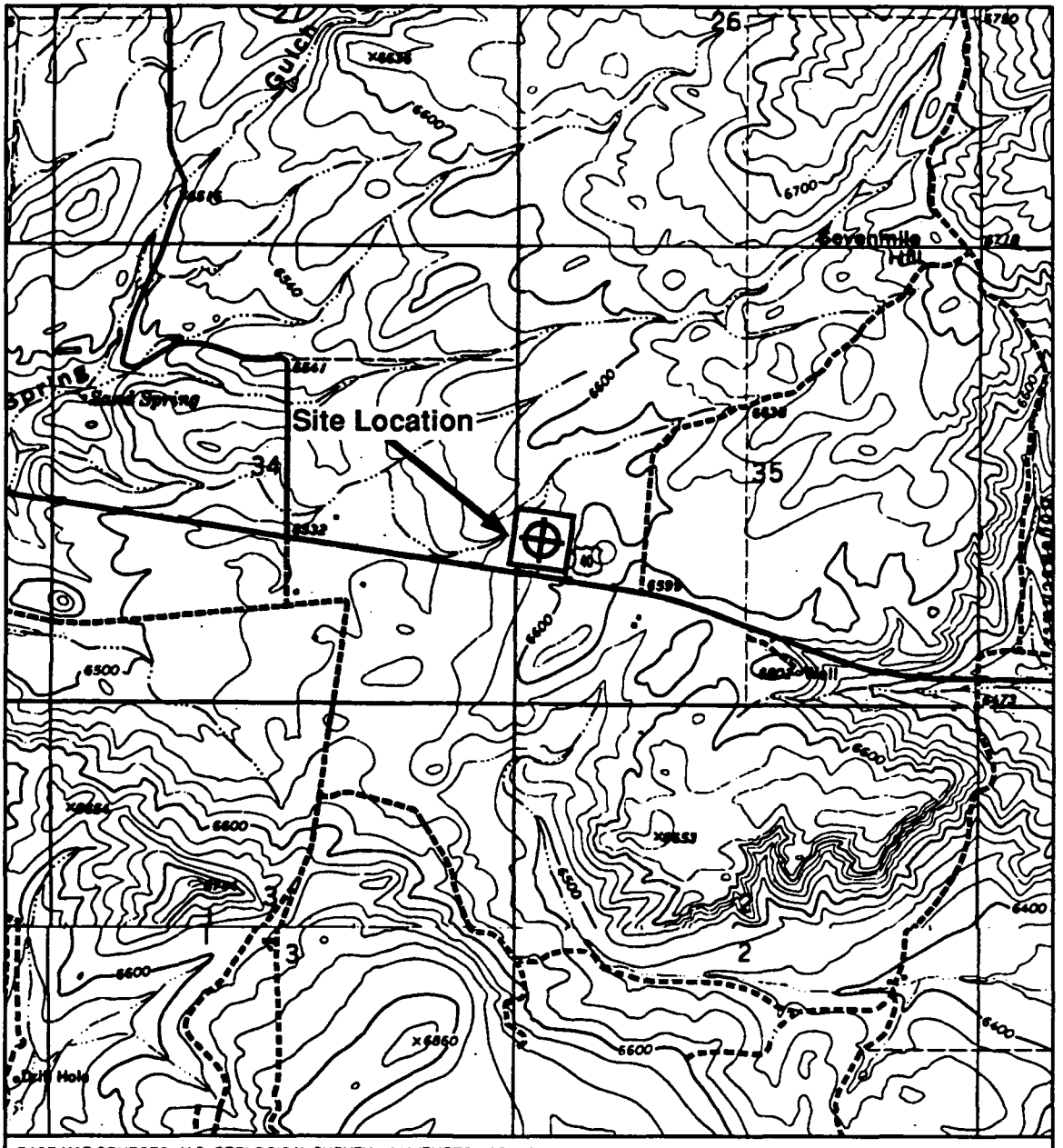


FIGURE B.4 TOPOGRAPHIC SETTING OF THE FAGG I SITE (CGS-14A)

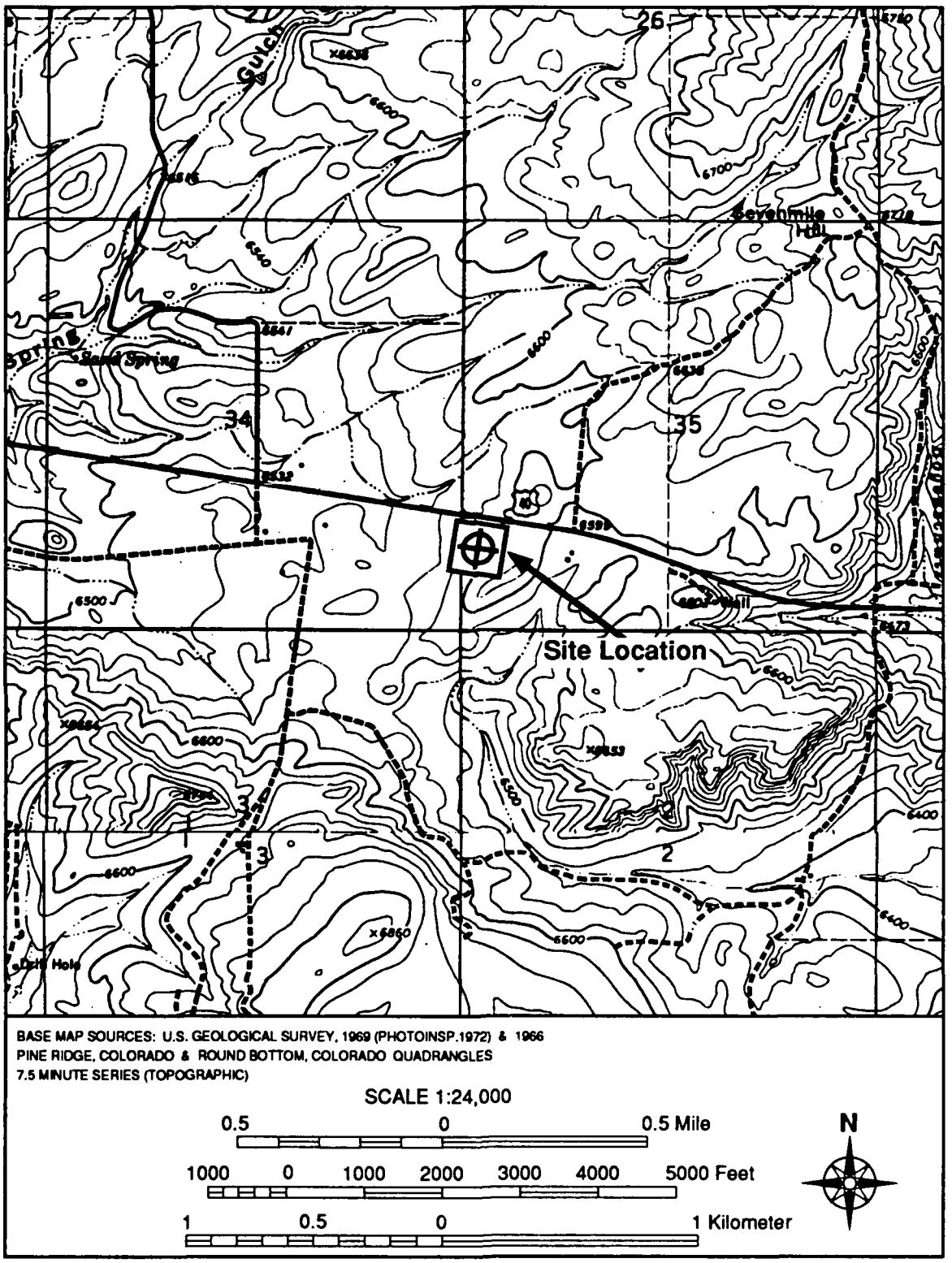


FIGURE B.5 TOPOGRAPHIC SETTING OF THE FAGG II SITE (CGS-14B)

APPENDIX C

CORRESPONDENCE

CORRESPONDENCE

Appendix C documents contacts with the following federal and state agencies and Native American groups:

Individual	Agency	Date	Response
William R. Noonan, Acting Colorado State Supervisor	U.S. Department of the Interior, Fish and Wildlife Service	10-13-89	Attached
Nancy I. Chu, Acting Colorado State Supervisor	U.S. Department of the Interior, Fish and Wildlife Service	04-20-90	Attached
Susan M. Collins, Deputy State Historic Preservation Officer for Archaeology	Colorado Historical Society, Office of Archaeology and Historic Preservation	08-12-89	Attached
Barbara Sudler, State Historic Preservation Officer	Colorado Historical Society, The Colorado History Museum	07-27-90	Attached
LeRoy W. Carlson, Colorado State Supervisor	U.S. Department of the Interior, Fish and Wildlife Service	05-01-92 12-31-92	Attached Attached

CORRESPONDENCE (continued)

Individual	Agency	Date Response
Neil Cloud, Language Coordinator	Southern Ute Indian Tribe, Ignacio, Colorado	A letter was sent on 07-25-90 but no written response has been received. Phone communications on 08-02-90, 08-06-90, and 03-08-91.
Judy Knight-Frank, Chairperson	Ute Mountain Ute Tribal Council, Towaoc, Colorado	A letter was sent on 08-25-92, but no response has been received to the letter or several attempts at phone communication.
Lawrence Bear, Chairman	Skull Valley Executive Committee, Unitah and Ouray Agency, Fort Duchesne, Utah	A letter was sent on 08-25-92, but no written response has been received. Phone communication on 02-02-93.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE
730 SIMMS STREET
ROOM 292
GOLDEN, COLORADO 80401

IN REPLY REFER TO:

October 13, 1989

FWE/CO

Mr. John Chamberlain
SRI International
333 Ravenswood Avenue
Menlo Park, California 94025

Dear Mr Chamberlain:

The U.S. Fish and Wildlife Service (Service) has reviewed the information you send on August 11, 1989 regarding the radio communications relay node site near Craig, Colorado as part of the Ground Wave Emergency Network (GWEN) communications system.

To comply with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies or their designees are required to obtain from the Service information concerning any species or critical habitat, listed or proposed to be listed, which may be present in the area of a proposed construction project. Therefore, we are furnishing you the following list of species which may be present in the concerned area:

FEDERALLY LISTED SPECIES

Bald eagle	Haliaeetus leucocephalus
Black-footed ferret	Mustela nigripes

Historically, the black-footed ferret occurred throughout Colorado. Literature and recent field studies document a close association between prairie dogs and black-footed ferrets. The standard that is used by the Service for determining possible project effects to black-footed ferrets is the disturbance of currently occupied prairie dog habitat. Should any of the activities associated with this project result in an impact to prairie dogs, black-footed ferret surveys may be necessary. As black-footed ferret surveys are considered valid for one year, prairie dog towns surveyed more than one year prior to construction may have to be resurveyed.

As the project may occur in the vicinity of the Yampa River, it is possible that GWEN related activities could impact bald eagle habitat. The initial determination of project effects to bald

eagles technically belongs to the lead Federal agency. While the Service believes that impacts to bald eagles as a result of the project will be minimal, it is appropriate for the agency to evaluate the potential impacts that may occur to bald eagles and come to a "no effect" or "may affect" determination. If the agency finds "no effect" as a result of the project, then consultation under the Endangered Species Act would terminate. Review of bald eagle data currently in the possession of the Bureau of Land Management and the Colorado Division of Wildlife may assist you in making the "may affect" or "no effect" judgement.

The Fish and Wildlife Service can enter into formal Section 7 consultation only with another Federal agency or its designee. State, county, or other governmental or private organizations can participate in the consultation process, help prepare information such as the biological assessment, participate in meetings, etc.

The lead Federal agency for Endangered Species Act (ESA) Section 7 consultation should review their proposed Federal action and determine if the action would affect any listed species. If the determination is "may affect" for listed species, the Federal agency must request in writing formal consultation from our office. At this time, your agency should provide this office a biological assessment and/or any other relevant information used in making the impact determinations.

In addition, the Service regards wetlands as an important resource due to their high value for fish and wildlife. Therefore, we recommend that the project area be inventoried for wetlands. Wetlands should be defined according to "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et al., 1977). We recommend that any adverse impacts to wetlands within the project influence be avoided.

If the Service can be of further assistance, please contact Denise Hann of the Grand Junction office at (303) 243-2778 or FTS 322-0351.

Sincerely,

Wm. R. Noonan

William R. Noonan
Acting Colorado State Supervisor

cc: FWS/FWE, GJ
FWS/FWE, SLC
CDOW, Craig

United States Department of the Interior

FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE
730 SIMMS STREET
ROOM 292
GOLDEN, COLORADO 80401

IN REPLY REFER TO:

April 20, 1990

APR 24 1990

Mr. John Chamberlain
SRI International
333 Ravenswood Avenue
Menlo Park, California 94025

Dear Sir:

The Service has reviewed the documents related to the siting of the U. S. Air Force's Ground Wave Emergency Network relay nodes in northwest Colorado (near Craig) and southcentral Colorado (Del Norte) and agrees with your "no effect" determination for endangered species, migratory birds, and wetland resources.

If you have any questions, please contact me at the above address.

Sincerely,

Nancy I. Chu
Acting Colorado State Supervisor

cc: CDOW, Grand Junction
FWS/FWE, Grand Junction
Att: Anderson/Osmundson/Thompson
FWS/FWE, Salt Lake City

COLORADO HISTORICAL SOCIETY
Office of Archaeology and Historic Preservation
1300 Broadway Denver, Colorado 80203

John Chamberlain
SRI International
333 Ravenwood Ave.
Menlo Park, CA 94025

08/12/1989

At your request, the Office of Archaeology and Historic Preservation has conducted a search of the Colorado Inventory of Cultural Resources for the following locations:

PM	TWNSHP	RANGE	SECTIONS:
6TH	8N	91W	30 31 32 33 34 35 36 25 26 27
6TH	8N	92W	27 28 29 30 31 32 33 34 35 36
6TH	7N	92W	12 13 14 23 24 25 26 33 34 35
6TH	7N	92W	36
6TH	6N	92W	1 2 3 10 11 12 13 14 23 24 25
6TH	6N	92W	26 36
6TH	6N	91W	
6TH	5N	91W	

ZONE; METERS EAST METERS NORTH:

COUNTY:

98 site(s) were located in the designated area(s).

Results of the search are summarized in the attached report.

If information on sites in the project area was found, detailed site information follows the summary. If no sites were found, but surveys are known to have been conducted in the project area, survey information follows the summary. We do not have complete information on surveys conducted in Colorado, and our site files cannot be considered complete because most of the state has not been surveyed for cultural resources. There is the possibility that as yet unidentified cultural resources exist within the proposed impact area.

Therefore, in the event there is Federal or State involvement, we recommend that a professional survey be conducted to identify any cultural resources in the project area which are eligible to be listed in the National Register of Historic Places. We look forward to consulting with you regarding the effect of the proposed project on any eligible cultural resource in accordance with the Advisory Council on Historic Preservation Procedures and the Preservation and Protection of Historic and Cultural Resources (36 CFR 800). Please provide this office with the results of the cultural

resource survey for our review of professional adequacy and compliance with regulations.

If you have any questions, please contact the Office of Archaeology and Historic Preservation at (303) 866-3395 or 3392.

Thank you for your interest in Colorado's cultural heritage.

Susan M. Collins
Deputy State Historic Preservation Officer for Archaeology

* Information regarding significant archeological resources is excluded from the Freedom of Information Act. Therefore, legal locations of these resources must not be included in documents for public distribution.

COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

July 27, 1990

Paul Kroupa
SRI International
333 Ravenswood Avenue
Menlo Park, California 94025

Re: Ground Wave Emergency Network System, Moffat County

Dear Mr. Kroupa:

This office has reviewed the cultural resource report prepared by Complete Archaeological Service Associates for the five proposed tower locations in Moffat County, Colorado.

Since no cultural resources were located during adequate surveys of the tower locations, we will concur with the no effect determination. Based on the maps and our cultural resource data base, we also find that there will be no effect to historic structures by these towers.

Should unidentified cultural resources be discovered during construction activities, work must be halted until the resources are evaluated in terms of the National Register criteria, 36 CFR 60.4, in consultation with this office.

If we may be of further assistance please contact Jim Green at 866-4674.

Sincerely,

for Barbara Sudler
State Historic Preservation Officer

BS/WJG

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
Colorado State Office
730 Simms Street, Suite 290
Golden, CO 80401
Phone (303) 231-5280 FTS 554-5280
FAX (303) 231-5285

FWE/CO: DOD-USAF MAY 01 1992
GWEN.ltr

Stephen, T. Martin, Lt Col, USAF
Program Manager, GWEN
Department of the Air Force
Headquarters Electronic Systems Division (AFSC)
Hanscom Air Force Base, Massachusetts 01731-5000

Re: Ground Wave Emergency Network (GWEN)

Dear Colonel Martin:

In response to your letters of April 23, 1992, and April 24, 1992, the Fish and Wildlife Service is providing verification of threatened and endangered species lists for the subject project. For clarity the lists for each GWEN site in Colorado are repeated below.

Craig Site

Listed species

Bald eagle Haliaeetus leucocephalus
Black-footed ferret Mustela nigripes

Candidate species

Hamilton milk-vetch Astragalus debequaeus
Gibbens beardtongue Penstemon gibbensii
Ownbey"s phacelia Cirsium owenbeyi
Black tern Chlidonias niger
Ferruginous hawk Buteo regalis
Columbian sharptailed grouse Tympanuchus lucida
Fringed-tailed myotis Myotis thysanodes pahasapensis
Spotted bat Euderma maculatum
Great Basin silverspot butterfly Speyeria nokomis nokomis

Dove Creek Site

Listed species

Peregrine falcon Falco peregrinus
Bald eagle Haliaeetus leucocephalus
Black-footed ferret Mustela nigripes

Candidate species

Ferruginous hawk Buteo regalis
Black tern Chlidonias niger
Fringed-tailed myotis Myotis thysanodes pahasapensis
Spotted bat Euderma maculatum

Del Norte Area Site

Listed species

Peregrine falcon Falco peregrinus
Bald eagle Haliaeetus leucocephalus
Black-footed ferret Mustela nigripes
Whooping crane Grus americana
Eskimo curlew Numenius borealis

Candidate species

White-faced ibis plegadis chihi
Ferruginous hawk Buteo regalis
Black tern Chlidonias niger
Mountain plover Charadrius montanus

The language provided in our earlier letters regarding requirements and procedures for listed and candidate species is still appropriate. Our concerns for powerline construction and wetland areas also remain.

From the letters you provided it is clear that the Air Force is preparing an Environmental Assessment for each potential GWEN site. Consolidation of these efforts into one National Environmental Policy Act (NEPA) document would simplify the process for reviewing agencies. As GWEN is clearly a single project of which these sites are parts, it is appropriate for the Air Force to disclose project impacts and benefits in one document.

If additional information is required, please contact Bill Noonan of this office at 303-231-5280.

Sincerely,

LeRoy W. Carlson
Colorado State Supervisor

cc: FWE, Grand Junction
FWE, SLC
CDOW, Grand Junction
CDOW, Montrose
CDOW, Monte Vista

United States Department of the Interior

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
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730 Simms Street, Suite 290
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FAX (303) 231-5285

FWE/CO: DOD-USAF
GWEN.ltr

DEC 3 1 1992

Stephen, T. Martin, Lt Col, USAF
Program Manager, GWEN
Department of the Air Force
Headquarters Electronic Systems Division (AFSC)
Hanscom Air Force Base, Massachusetts 01731-5000

Re: Ground Wave Emergency Network (GWEN)

Dear Colonel Martin:

In response to your letter of December 17, 1992, the Fish and Wildlife Service is providing verification of threatened and endangered species lists for the subject project. The lists for each project site have not changed since our last correspondance. The Service appreciates your diligent efforts toward maintaining current threatened and endangered species lists for the Ground Wave Emergency Network project. For simplicity the lists for each GWEN site in Colorado are repeated below.

Craig Site

Listed species

Bald eagle *Haliaeetus leucocephalus*
Black-footed ferret *Mustela nigripes*

Candidate species

Hamilton milk-vetch *Astragalus hamiltonii*
Gibbens beardtongue *Penstemon gibbensii*
Ownbey's thistle *Cirsium owenbeyi*
Black tern *Chlidonias niger*
Ferruginous hawk *Buteo regalis*
Columbian sharptailed grouse *Tympanuchus lucida*
Fringed-tailed myotis *Myotis thysanodes pahasapensis*
Spotted bat *Euderma maculatum*
Great Basin silverspot butterfly *Speyeria nokomis nokomis*

Dove Creek Site

Listed species

Peregrine falcon Falco peregrinus
Bald eagle Haliaeetus leucocephalus
Black-footed ferret Mustela nigripes

Candidate species

Ferruginous hawk Buteo regalis
Black tern Chlidonias niger
Fringed-tailed myotis Myotis thysanodes pahasapensis
Spotted bat Euderma maculatum

Del Norte Area Site

Listed species

Peregrine falcon Falco peregrinus
Bald eagle Haliaeetus leucocephalus
Black-footed ferret Mustela nigripes
Whooping crane Grus americana
Eskimo curlew Numenius borealis

Candidate species

White-faced ibis plegadis chihi
Ferruginous hawk Buteo regalis
Black tern Chlidonias niger
Mountain plover Charadrius montanus

The language provided in our earlier letters regarding requirements and procedures for listed and candidate species is still appropriate. Our concerns for powerline construction and wetland areas also remain.

If additional information is required, please contact Bill Noonan of this office at 303-231-5280.

Sincerely,

LeRoy W. Carlson
Colorado State Supervisor

cc: FWE, Grand Junction
FWE, SLC
CDOW, Grand Junction
CDOW, Montrose
CDOW, Monte Vista
File
Reading File

APPENDIX D

GLOSSARY

GLOSSARY

Abbreviations and Units of Measure

AM	Amplitude Modulation
ATU	Antenna tuning unit
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BUPG	Back-up power group
CASA	Complete Archaeological Service Associates
CGS	Candidate GWEN site
CNAP	Colorado Natural Areas Program
dBA	Decibels on the A-weighted scale, which is a measure of the intensity of the sounds people can hear
EA	Environmental Assessment
EBI	Encyclopedia Britannica, Inc.
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration

FEIS	Final Environmental Impact Statement; in this document, the term refers to the FEIS for the GWEN Final Operational Capability that was released in September 1987 by the U.S. Air Force, Electronic Systems Division, Hanscom Air Force Base, Massachusetts
FIA	Federal Insurance Administration
FICWD	Federal Interagency Committee on Wetlands Delineation
FOC	Final Operational Capability, the third phase of development of GWEN
FONSI	Finding of No Significant Impact
gal/min	Gallons per minute
GPO	Government Printing Office
GWEN	Ground Wave Emergency Network
HEMP	High-altitude electromagnetic pulse
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning, the formal review process for the EA
kHz	Kilohertz
kV	Kilovolt
LF	Low frequency
mg/l	Milligrams per liter (1 mg/l = 1 ppm)

MM	Modified Mercalli, a scale of the severity of earthquake effects
MSL	Mean sea level
µg/l	Micrograms per liter (1 µg/l = 1 ppb)
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council, the principle operating agency of the National Academy of Sciences and the National Academy of Engineering
NRHP	National Register of Historic Places
PAWS	Potential areawide sites; the portion(s) of an SSA left after application of those siting criteria that do not require a field survey, such as the location of national and state parks
PCGS	Potential candidate GWEN site; any site that is identified from roadside surveys as suitable for further investigation
PGS	Preferred GWEN site; the CGS identified by the Government that represents the Government's preferred location for a relay tower
PSER	Preliminary Site Evaluation Report
ppb	Parts per billion
SCS	Soil Conservation Service

SHPO	State Historic Preservation Officer; the person responsible for administering the National Historic Preservation Act at the state level, reviewing National Register of Historic Places nominations, maintaining data on historic properties that have been identified but not yet nominated, and consulting with federal agencies concerning the impacts of proposed projects on known and unknown cultural resources
SSA	Site search area; the 250-square-mile area within which four to six CGSs are identified; the SSA is the area within a 9-mile radius of a set of nominal coordinates in the network design. It is used as a manageable range in which to conduct siting investigations
TLCC	Thin Line Connectivity Capability; the second phase of development of GWEN
UHF	Ultrahigh frequency (band); specifically 300 to 3,000 megahertz
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VMC	Visual Modification Class

Definitions

Air pollutant	An atmospheric contaminant, particularly the 15 atmospheric contaminants specified in federal and most state regulations
Alluvial	Pertaining to loose river sediments, such as clay, silt, sand, and gravel
Anaerobic	Occurring in the absence of free oxygen
Archaeological survey	A survey conducted by a trained archaeologist that is designed to test for the presence or absence of archaeological resources; it involves walking an area at predetermined intervals and may involve digging small shovel pits in areas of high probability or if ground visibility is low
Avian	Pertaining to birds
Candela	A unit of measure of the intensity of light equal to the brightness of one candle
Class III	A division of a Phase I archaeological survey. A Phase I survey is often divided into Class I, a literature review and search; Class II, a sample survey; and Class III, a 100 percent survey
Cuesta	A hill or ridge with a steep face on one side and a gentle slope on the other
Cultural resource	Prehistoric, Native American, and historic sites, districts, buildings, structures, objects, and any other physical evidence of past human activity

Escarpment	A steep slope resulting from erosion or faulting that separates two comparatively level surfaces
Evaluative criteria	Applied to portions of a potential siting area for a GWEN facility to determine its suitability. Areas that rank low against evaluative criteria may be excluded from consideration, or given a low priority in the site selection process
Exclusionary criteria	Criteria used to eliminate or exclude highly sensitive areas or areas that do not meet the limits of acceptable performance from consideration for GWEN facilities
Fault	A break in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust; adjacent surfaces are differentially displaced parallel to the plane of fracture
Federal jurisdictional wetland	As defined in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (GPO 1989-236-985/00336), a wetland is a class of habitats distinguished by the presence of saturation to the surface or standing water during at least 1 week of the growing season (wetland hydrology), a soil type characteristic of saturated or poorly drained conditions (hydric soils), and the predominance of plants that only or mostly occur on wet sites (hydrophytic vegetation)
Floodplain	Land adjacent to a river that is commonly covered by water during high flow periods
Forb	An herbaceous plant other than a grass, especially one growing in a field or meadow

Ground plane	A part of the antenna system consisting of buried copper wires that extend radially from the base of a GWEN tower for a distance of approximately 330 feet
Habitat	The place normally occupied by an organism
Historic properties	For the purposes of this EA, historic properties are those aboveground structures and resources that are listed or eligible for listing on the National Register of Historic Places
Hydric soil	A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part
Miocene	The geologic epoch 5 to 25 million years ago
Modified Mercalli scale	A measure of the intensity of seismic activity based on human perception of the event and potential for damage; the intensity is rated on a Roman numeral scale ranging from I to XII. An earthquake of MM intensity I would be detectable only be seismographs; MM intensity V would shake buildings, break dishes and glassware, and cause unstable objects to fall; MM intensity X would destroy most masonry and frame structures, bend railroad rails slightly, and cause tidal waves and landslides; MM intensity XII would cause nearly total destruction of all buildings. Another commonly used seismic intensity scale, based on readings from a seismograph, is the Richter scale, which was developed in 1935. The Modified Mercalli scale is often used when the historic period to be covered includes data prior to 1935
Native American	A generalized reference to an individual whose ancestry may be traced to one of the indigenous American cultures

Paleonto-logical	Pertaining to fossils or the study of fossils
Paleozoic era	Geologic period of time from 230 million to 620 million years ago
Paleocene	The period of geologic time from 55 million to 65 million years ago
pH	A measure of acidity in which the lower the number, the more acidic the substance; 7 represents neutrality
Phase I survey	A survey designed to identify properties that are listed, eligible for listing, or potentially eligible for listing on the National Register of Historic Places within the area that would be affected by the proposed project
Prime farmland	Land that contains soils having high crop production either naturally or through modification; the U.S. Soil Conservation Service is responsible for designating prime farmland
Quarternary	Geologic period of time 2 million to 3 million years ago
Raptors	Birds that feed on live animals
Riparian	Pertaining to the bank of a natural course of water
Top-loading element	Portions of the GWEN antenna that extend diagonally from the top of the tower, which strengthen the signal and provide additional structural support like guy wires
Tufaceous	Quality of a porous rock formed as a deposit from springs or streams